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Greetings to our professional and associate colleagues in academia.

We thank God for the third volume of the Journal of Family and Society Research. The journal is published by the Association of Family and Society Scientists. It is a multidisciplinary platform that allows academics and other affiliated professions to share their research findings with the rest of the globe. The journal publishes all studies on global challenges that affect people, families, and society as a whole.

The Journal of Family and Society Research aims to publish articles with high-quality material and explicit methodological approaches. Every published paper is subjected to a series of assessments by our capable editorial team, all of whom have a track record of academic success in their respective fields.

The publication of Volume 3 of this periodical implies that AFASS's vision and goal are advancing. We invite you to continue participating in AFASS's yearly international conferences and seminars. JFSR offers both print and online publications.

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Brain Re-Engineering Concept & Reimagination: Strategy for Promoting Ethics, Values & Inclusivity in Food Chain Security

Ikechi Agbugba

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Abstract

It is projected that the demand for food will surge by 70%, which aligns with rapid population growth. Research findings from a UN study indicates that about 9.9% of global population still goes hungry, so the thought of feeding almost 10 billion persons is still anticipated as daunting. With environmental changes hard to predict, we must turn to innovation in agriculture technology. Their importance in tackling this issue cannot be over emphasized. Hence, the concept of brain re-engineering and reimagination which underscores it as a prospective strategy for enhancing nations through women empowerment, youth engagement, among other areas on food chain security initiatives when practiced ethically, valuably and inclusively, in order to unlock transformation in an economy. It emphasizes on harnessing the potential of the women and youths by redirecting their energy and innovative capabilities towards modernized food chain practices which much have some touch of inclusivity, ethics and value. Through this, it aims to foster a generation of leaders in food chains to drive the needed transformation as it were.

Keywords: Brain Re-Engineering (BRECR), Food Chain Security, Women Empowerment, Youth Engagement, Value, Ethics, Inclusivity

Introduction

Throughout the evolution of technology, agriculture has remained remarkable (Climate Change Committee, 2023). Conversely, food chain security encompasses food availability in a geographic location, as

well as the capability of the inhabitants within that region to access, utilize and source sufficient food for a period of time (Agbugba *et al.*, 2023a). Food chain security is only a snap-shot of one week food consumption at either risk of micronutrient deficiencies or

likely to have severe food access issues. It neither captures seasonal changes, quantify food gaps, capture intra household food consumption nor show how food consumption has changed as a result of crisis, as it were. I must underscore that the remarkable advancements witnessed in food chain security serves as evidence of the significant progress and breakthroughs taking place in our contemporary world during the industrial revolution (IR) era. The interdependency of the industrial and agrarian revolutions has consistently been evident, explaining why economies with stagnant agricultural sectors often struggle to experience industrial growth and development (Plecher, 2020). Throughout history, transformative changes have played a favourable role, and the industrial revolution stands out as a monumental global transformation. Undoubtedly, it has made a lasting impact on the socio-economic and developmental advancements of our modern world. The Industrial Revolution (IR) represents a significant period in history where the use of machines in factories superseded manual labour. Over the course of the past two centuries, the IR has brought about profound transformations, rivaling the impact of the Neolithic Revolution. Occurring approximately 12,000 years ago, the Neolithic Revolution marked a transition from a nomadic lifestyle dependent on hunting and gathering to one characterized by settled agricultural practices and the use of polished stone tools. This shift enabled

the development of permanent settlements and played a crucial role in supporting larger populations.

Relationship between Ethics, Value and Inclusivity in Food Chain Security

Feeding the world ethically implies securing all-round access to safe and nutritious food for enhancing human welfare and hunger alleviation (United Nations, 2023). For others, it is securing food of adequate aggregates and high standards for a healthy and decent life. With this in mind, there are three main ideas to understand:

- a) We must underscore that unethical behaviour work in consonance with the crux of mortality.
- b) It is not herculean for employees to exhibit unethical behaviour.
- c) Context plays a huge part in fashioning the actions, habits and behaviours of the masses.

In recent years, a discernible paradigm shift has been underway, one that heralds a burgeoning recognition of the pivotal role played by different genders in promoting ethics, values and inclusivity in food chain security (Hendriks et al., 2023). Acknowledging their indomitable spirit and invaluable contributions to food production and supply chains, there has been a palpable impetus towards fostering gender inclusivity and empowerment within the agricultural domain. It is against this backdrop that this paper seeks to unravel the intricacies of agribusiness management, offering a nuanced understanding of the strategies that underpin its efficacy

while simultaneously propelling the cause of gender empowerment forward.

Brain Re-Engineering Concept and Reimagination (BRECR): An Unveiling?

BRECR focuses on addressing the mindset issues of individuals and proffers a workable model to revive grappling economies through food chain security (Agbugba, 2023b). This is particularly important in the current age of heightened ecological concerns and climate change issues, where sustainable agriculture is a crucial topic (Ngigi & Muange, 2022). As the global population continues to grow, the scarcity of land and water poses a significant threat to human existence (Apeh et al., 2023). We must reckon that start-ups and technology in food chain security are ardently proceeding with steps to mitigate the bottlenecks. It is crucial to admit that advancements in machinery have revolutionized the scope, momentum, and productivity of automation or farming device (Onomu et al., 2020). This, in turn, enables more efficient cultivation of various inputs and variables on productive lands.

Improvements in seeds, fertilizers, and irrigation systems have greatly

contributed to helping farmers increase their yields in crops, livestock, agroforestry, and fisheries. Hence, the concept of BRECR which forebears on changing the wrong perception problem people, especially women and youths have about food chain security thereby underscoring it as a prospective strategy for enhancing their engagement in promoting good values, ethics, inclusiveness and inclusivity to build their innovativeness and entrepreneurship capacity in food chain security.

Gender Equality and Food Security

Global food insecurity and inadequate nutrition are exacerbated by gender inequalities, which influence the access to food and other resources for men and women in urban and rural communities. SDG 5 is focused on pursuing the main goal of real and sustained gender equality in all aspects of women and girls' lives which includes:

- ❖ Ending gender disparities
- ❖ Eliminating violence against women and girls' lives
- ❖ Eliminating early and forced marriage
- ❖ Securing equal participation and opportunities.

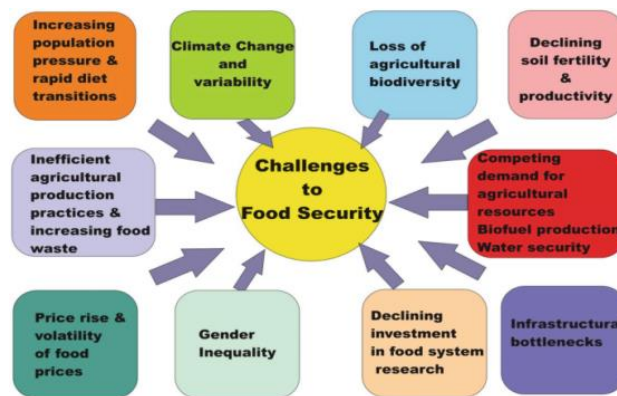


Fig 1.0: Challenges of Food Security

Foresight Research & Gender Equality as Driver of Food Systems Transformation

Foresight research has yet to explore gender equality as an outcome and a driver of food system transformation fully. Foresight analysis can assess which food system investments and interventions are most effective at reducing gender inequities and increasing women's empowerment. Addressing structural inequalities, promoting inclusivity in decision-making, and challenging patriarchal norms can enhance gender equality, social inclusion, and women's empowerment in food system transformation.

Neglecting gender barriers when designing and disseminating food system innovations may exacerbate gender inequalities and limit women's empowerment. Gender equality, women's empowerment, and social inclusivity also drive food systems transformation, leading to improved welfare outcomes for all. FR examines how closing gender gaps in livelihood opportunities, agricultural

productivity, and resilience capacities can impact other food system outcomes, such as poverty reduction, food security, and nutrition. While data on gender inequities in food systems and women's empowerment have increased over the last 10 years, more sex-disaggregated data and impact evaluation studies are needed for rigorous foresight research on gender equality in agrifood systems.

Pillars of Brain Re-engineering (BRECR)

The brain re-engineering pillars hinges on awareness creation or education especially women, youngsters and youths on the knowledge and operational guidelines on values, ethics and inclusivity on FCS (Agbugba, 2023a). This is a paradigm shift that entails building of ideas and knowledge levels of youths in order to volunteer their willingness to change the negative or wrong ideologies and mindset creativity to appropriate a correct or right perceptive. It also involves volunteering some advice to engaging in agriculture or agro-related

ventures entrepreneurially to employ technology solutions to drive a sustainable change.



Fig 2.0: Pillars of Brain Re-engineering. Source: Agbugba (2023)

As presented in Figure 2.0, the brain re-engineering (BRECR) pillars revolve around perception change, ideation and entrepreneurship, technology integration, sustainability and circular economy; and social equity in public policy. The institutions that can actualise this are institutions or platforms such as educational (formalised and non-formalised) institutions, and the social media.



Perception Change: This involves identifying the wrong and unethical ideologies, values and mindset about food chain security and the willingness

to drop them. This thought process must be frank, sincere and intentionally-approached in interchanging these wrong ideologies or perceptions about agriculture.

Ideation and Entrepreneurship: This can be addressed on a dual basis and entails formation of new ideas or concepts, as well as building or developing their entrepreneurship capacity as that would to a large extent promote ethics, values, and inclusivity. Having or showing initiative and resourcefulness is intended to be accompanied by expressing some good degree in being innovative which is all about being original, creative & introducing some new business ideas.

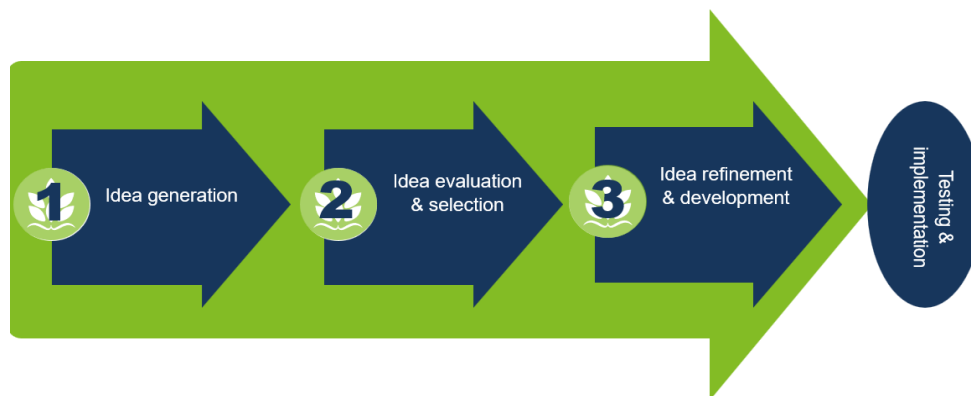


Fig 3.0: Process of Ideation

Technology Integration: This must be followed after Ideation and entrepreneurship and entails application of the knowledge of science to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment. In addition, training on different technological options, solutions and knowledge are not left out. Today's agriculture routinely utilises sophisticated technologies such as robots, temperature and moisture sensors, aerial images, as well as GPS technology. These advanced devices, precision agriculture and robotic systems allow businesses to be profitable, efficient, safer, and more environmentally friendly. We must reckon that trends in food tech are utilising ultramodern technologies such as artificial intelligence, internet of things, and blockchain to unlock transparency, dispense traceability and potentially structure systems to discharge inclusivity and transformation across the entire food supply and value chains. These technologies can further improve

safety and quality of food, all things remaining equal.

Sustainability and Circular Economy: According to Agbugba (2023a), sustainability and circular economy resonates around promoting inclusivity, maintaining ethical behaviours, standards, intentionality, productivity, as well as consistence, coupled with the right value within a food chain. Every activity and practise between production, manufacturing, processing or value-addition, marketing or distribution from time to time and from season to season must factor in training and education; research and innovation; cross-sector collaboration; regenerative practices and nature-based solution; and also, transparency and traceability. Moreover, circular economy in the BRECR model identifies food-based initiatives to ensure a sustainable growth from farm to fork over time. With the circular economy, we can drive the optimization of resources, reduce the consumption of raw materials, and recover waste by recycling or giving it a second life as a new product.

Social Equity in Public Policy: This conceptualises the description from an expression of impartiality, fairness, and justice for all people especially agripreneurs in social policy (Agbugba, 2023b). Social equity considers systemic inequalities to ensure everyone in a community has access to the same opportunities and outcomes (Agbugba, 2023a).

The key component of social equity in public policy revolves around social equity, impartiality, justice, inclusivity, public policy (both fiscal and monetary policies), community, government. This whole idea fosters equal privileges for key players, as well as practitioners in supply and value chains of food and agricultural systems such as equal rights to resources and government assistance such as subsidies, funding and agtech solutions. We must understand that social equity is about whether citizens of different social groups are treated equitably or fairly and whether they receive the same treatment (Agbugba, 2023c).

Truly, agriculture is often high tech and today's agriculture routinely uses sophisticated technologies such as robots, temperature and moisture sensors, aerial images, and GPS technology. Farmers and others use science and technology to collect data, analyse efficiency, monitor growth and quality, and more to save money and get better yields. In essence, advanced devices, precision agriculture and robotic systems allow agribusinesses to be more profitable, efficient, safer, and more environmentally friendly.

Why Youth Engagement in Food Chain Security: United Nations Perspective

By 2050, the demand for food will surge by 70%, which aligns with rapid population growth. Research findings from a UN study indicates that about 9.9% of global population still goes hungry, so the thought of feeding almost 10 billion persons is still anticipated as daunting. With environmental changes hard to predict, we must turn to innovation in agriculture technology (HLPE, 2021). The role of youths and youngsters of Africa is really a concern as their perception towards farming and agribusiness is outdated and regarded as wrong (Agbugba 2020). Their importance in tackling this issue cannot be over emphasized. Hence, the concept of brain re-engineering and reimagination which forebears on changing the wrong perception problem youths have about agriculture thereby underscoring it as a prospective strategy for enhancing youth engagement in agriculture to build their entrepreneurship capacity. I reckon, from the findings of previous high level panel of experts (HLPE) studies about youths in driving transformation have shown that:

- ❖ Youths are on the front lines to build the food systems of the future, while also bearing significant risks from climate change, social and economic inequities, and political marginalization.
- ❖ Food systems provide a wide spectrum of opportunities for the engagement & employment of

young people across diverse global contexts, but these jobs do not always provide decent & meaningful work or adequate livelihoods.

In response, policies and initiatives to protect and strengthen youth engagement and employment in food systems need to be based on the pillars of rights, equity, agency and

recognition. The redistribution of resources, knowledge, and opportunities for youth innovation and engagement in the development of context-specific employment and labour policies cannot only contribute to creating jobs for youth but can also directly support transitions to sustainable food systems. Figure 1 presents the 17 UN SDGs Agenda



Fig 4.0: The Seventeen (17) United Nations Sustainable Development Goals Agenda

From Figure 1, SDGs 2 aims at eradicating extreme hunger, attaining food chain security, as well as improved nutrition thereby promoting sustainable agricultural practices. In order to achieve this, it is pertinent to address the underlying structural bottlenecks touching on poverty, poor access to education, health-care, and employment, climate change, water and resource scarcity, to mention a few.

Conceptualizing Food Chain Security (FCS)

FCS encompasses every aspect relating to food availability, as well as how individuals, people, communities or countries access food to food supply chain resilience, and also how much households spend on food. In order words, FCS can be described as a nation's ability to sufficiently feed itself.

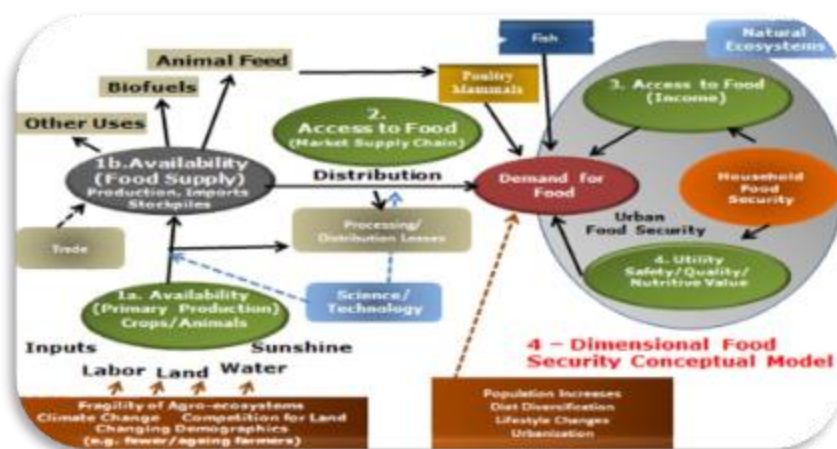


Figure 5.0: Understanding Food Security from the four (4) pillar dimension

Food Chain Security and Development

FCS is one of the proxies for measuring the progress of an economy (UN, 2020). This implies that economic development indices are incomplete without FCS. Africa's food import bill

hit US\$ 85 billion in 2021 and is expected to surpass US\$ 110 billion by 2025. Figure 6.0 presents a diagrammatic picture of attaining development through the crucible of food chain security.

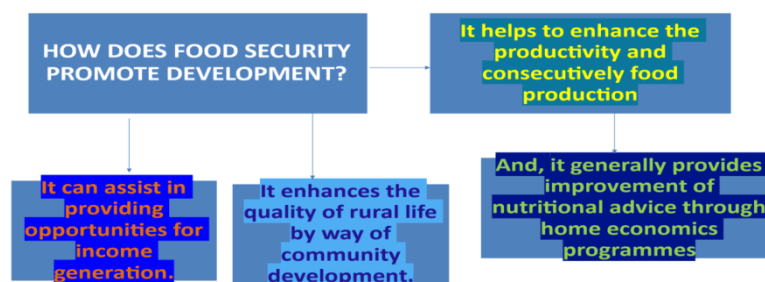


Figure 6.0: Food Chain Security: Towards promoting Development

As one of the indicators for measuring economic development, food security can be actualised simultaneously alongside the progress of an economy

at a macro level. Globally, while many countries carry-out economic growth and development policies to unlock an

economy through food security initiatives.

Youth Engagement in Food Chain Security

Research findings from a UN study indicates that about 9.9 of global population still goes hungry, so the thought of feeding almost 10 billion persons is still anticipated as daunting. With environmental changes hard to predict, we must turn to innovation in agriculture technology (Agbugba, 2023b). Youths need to take up business opportunities in agriculture if African countries can ensure food security for the populace. Food Chain Security is potentially fortified to provide meaningful employment and help to ensure that the energies of young people are channeled appropriately.

African governments and development partners are urged to increase support for youth

engagement in agriculture-related programmes as they could help in making the continent food secure. More local and more sustainable, the new face of African agriculture aims to ensure the continent's food security while guaranteeing the competitiveness of exported products on the world market. By supporting local producers, agro-industrial players and investors have a vital, constructive and profitable role to play.

Food Systems Conceptualised

Food system is conceptualised to hinge on the compound nexus representing every activity encompassing food production, processing, distribution and consumption. They are composite grid that factors in all the inputs and outputs relating to food chain security (Agbugba, 2023).

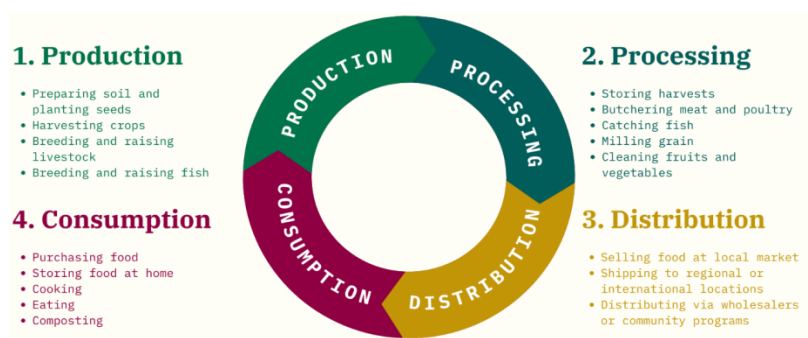


Fig 7.0: Diagrammatic Presentation of Food Systems

Industrial Revolution (IR) and its impact on Agriculture and Food Chain Security

FCS can interchangeably mean agriculture and its important role in ensuring food chain security cannot be

over emphasised. Agriculture has never been left out in the various technological and scientific advances of man.

Interestingly, agriculture has never been left out in the various technological and scientific advances of man. How far the agriculture sector has come in development and production is a proof to the excellent progress and breakthrough recorded in our modern world realised in these evolving times of industrial revolution (IR). Industrial and agrarian revolutions always go hand-in-hand, and that is the reason why economies in which agriculture is more or less static does not show industrial progress or development. History has always been in favour of earthmoving changes and one of such transformations in the globe came in the guise of IR. Truly, it left a lasting footprint in the socio-economic and developmental strides of the modern world.

IR can be described as the period of time during which work began to be done more by machines in factories than by hand. Over the past 2 centuries, IR transformed the world

most profoundly in human history since the neolithic revolution. The neolithic revolution about 12, 000 years ago (i.e. the first agricultural revolution when people began to farm and used polished stone tools, which was succeeded by the Bronze Age) is the period from a lifestyle of hunting and gathering to one of agriculture and settlement, thereby making an increasingly larger population possible.

Historical Facts & the Fourth Industrial Revolution (4IR)

History has always been in favour of earthmoving transformations and one of such transformations in the globe came in the guise of industrial revolution (IR). Truly, it left a lasting footprint in the socio-economic and developmental strides of the modern world. IR can be described as the period of time during which work began to be done more by machines in factories than by hand. IR was made possible by the change in new agricultural revolution. Second revolution era was when people learned how to farm and domesticate animals.

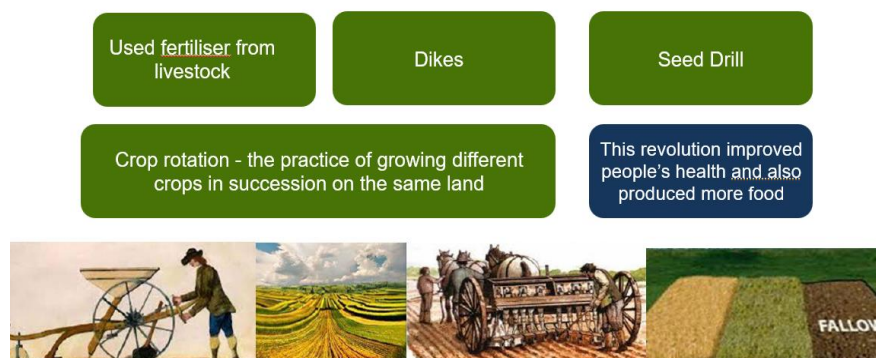


Fig 8.0: Food Chain Security and Industrial Revolution

Truly, the Dutch led the way in agricultural revolution and their approach centred on combining smaller fields into larger ones to make better use of the land and used fertilizer from livestock to renew the soil. From Fig 8.0, FCS is connected to agricultural revolution.

Industrial Revolutions and Agriculture: Focus on 4IR

Agricultural production has been attributed to physical factors such as soil quality, water availability, and climate. However, the current need is to drive economic transformation by embracing the new dimensions of technology. Brain re-engineering seizes this opportunity, to leverage on the advancements of the fourth industrial revolution (4IR) and technologies such as artificial intelligence (AI), blockchain, internet of things (IoTs), agricultural drones,

and other innovative solutions operating in the realm of cyberspace.

Throughout history, technological innovations have significantly influenced the agriculture sector. An array of cutting-edge solutions that revolutionize farming practices is typical about 4IR (Karunathilakeet al., 2023). Examples include bee vectoring technologies, precision agriculture, indoor vertical farming, livestock farming technologies, laser scarecrows, farm automation, real-time kinematic (RTK) technology, mini-chromosome technology, farm management software, and water management technologies. From the invention of the plough to GPS-driven precision farming equipment, humans have constantly developed new approaches to enhance farming efficiency and productivity.

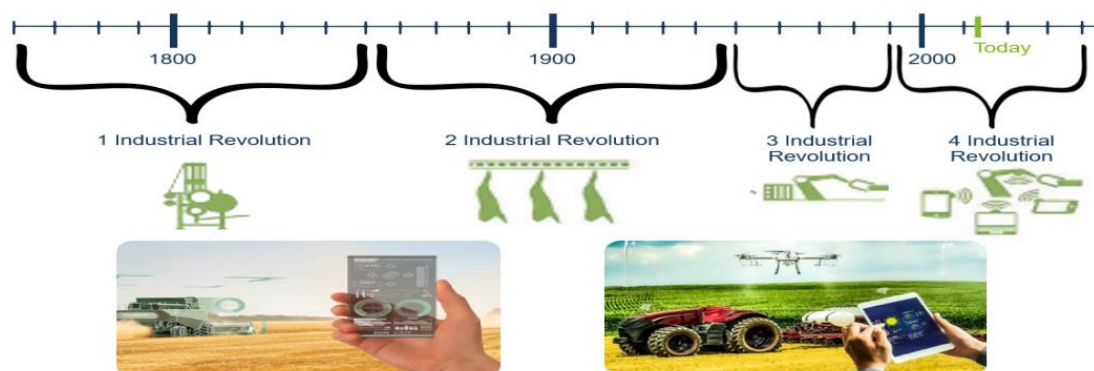


Fig 9.0: Industrial Revolutions Summarised

The fourth industrial revolution (4IR) is characterized by the convergence of the physical, digital, and biological worlds, resulting in a fusion of

agricultural innovation systems (AIS) advancements (Ndungu & Signe, 2020). AIS encompasses the knowledge, technology,

infrastructure, and cultural aspects that people have developed and are experimenting with sustainability in agriculture. Examples of AIS include farmland surveillance drones, blockchain technology, artificial intelligence, Internet of Things (IoTs), automation, CRISPR

and genetic editing (biotechnology and nanotechnology

Precision Agriculture (PA)

PA is an agricultural management approach that harnesses information technology to deliver precise and targeted care to crops and soil, optimizing their health and productivity.

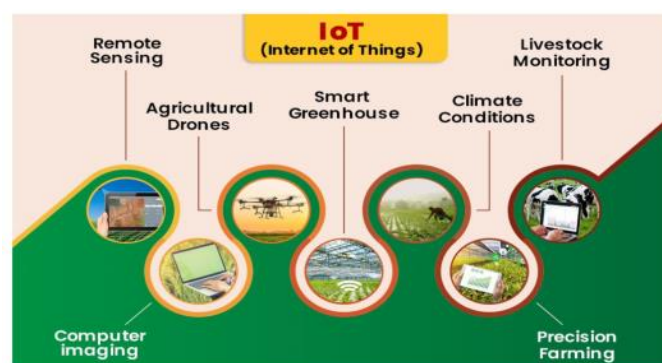


Fig 10.0 Agriculture in Industry 4.0 Era

The key objectives of PA are to increase profitability, promote sustainability, and protect the environment. Through the integration of advanced technological solutions like chemicals and larger tractors, farmers can effectively manage larger land areas with reduced labour. Government policies often encourage farmers to expand their operations, capitalizing on the benefits of economies of scale (Isukuletal.,2019).

Government's Role in Promoting Ethics, Values, Inclusivity and

Sustainability in Food Systems (Policy Recommendations)

Agriculture in the EU is regulated under the Common Agricultural Policy (CAP). It is believed that from 2020 to 2024 will result in EU investing over €15 billion on global food chain security. Interestingly, within the year 2021-2027, projections that the EU will support food systems in about 60 member nations. The EU and member states provided that some guarantee of about €1 billion will redirect food chain security in the Sahel Region.

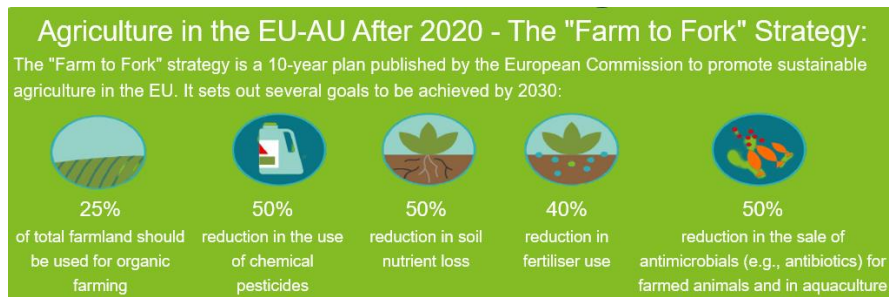


Fig 11.0: Farm-to-Fork Strategy

Since 1984 there have been several reforms to the CAP to make it more efficient, cheaper and sustainable. The CAP has gone from 73% of the EU budget in 1985 to 37% in 2017.

Decade of Action on Food Chain Security: UN SDGs Agenda

With just 6 years to go, an aspiring global endeavour is underway to fulfil

the 2030 agreement. Secretary General of the United Nations called on each sector of an economy to remodel our world from 2020-2030 (United Nations, 2020). This attempt is structured to achieve this through government preparation, civic organisations as well as enterprises on their call to expedite sustainable options.



Fig 11.0: Translating Insecurity to a Security in the Food Sector

From Figure 11.0, a headway is currently playing out in many places but, overall, action to meet the goals is not yet advancing at the momentum required. The following key players and institutions bridge the gap between insecurity and security of food: emergency food assistance, soup kitchens, child nutrition, food production farms, farmers' markets, gardening, snap education, youth education and mentor/promoter.

It was recorded that 2020 ushered in a season of aspiring steps to dispatch the objectives by the year, 2030 through stimulation of speed in tackling the global bottlenecks stretching from poverty to inequity, climate change, and shutting the financial aperture.

Brain Re-Engineering Strategy as tool in Rebranding Agriculture for Youth Engagement: Strategy for Entrepreneurship Development and attainment of United Nations SDGs Agenda

The core focus of brain re engineering and reimagination is conceptualized and hinges on changing this perception problem of youths as it stands to provide a veritable strategy in transforming their lives and societies through their engagement in food security initiatives, agriculture or agribusiness sector.

Our population is growing, and increasing shortages of land and water pose a note worthy threat to the longevity of humans as we know it.

Gender Inclusivity and Food Security

Global food insecurity and inadequate nutrition are exacerbated by gender inequalities, which influence the access to food and other resources for men and women in urban and rural communities. SDG 5 is focused on pursuing the main goal of real and sustained gender equality in all aspects of women and girls' lives which includes:

- ❖ Ending gender disparities
- ❖ Eliminating violence against women and girls' lives
- ❖ Eliminating early and forced marriage
- ❖ Securing equal participation and opportunities

Foresight Research & Gender Inclusivity as Driver of Food Systems Transformation

Foresight research has yet to explore gender equality as an outcome and a driver of food system transformation fully. Foresight analysis can assess which food system investments and interventions are most effective at reducing gender inequities and increasing women's empowerment.

Addressing structural inequalities, promoting inclusivity in decision-making, and challenging patriarchal norms can enhance gender equality, social inclusion, and women's empowerment in food system transformation. Neglecting gender barriers when designing and disseminating food system innovations may exacerbate gender inequalities and limit women's empowerment.

Gender equality, women's empowerment, and social inclusivity also drive food systems transformation, leading to improved welfare outcomes for all (Perkins, 2022). FR examines how closing gender gaps in livelihood opportunities, agricultural productivity, and resilience capacities can impact other food system outcomes, such as poverty reduction, food security, and nutrition.

While data on gender inequities in food systems and women's empowerment have increased over the last 10 years, more sex-disaggregated data and impact evaluation studies are needed for rigorous foresight research on gender equality in agrifood systems.

Fourth Industrial Revolution (4IR) and Precision Farming: Bridging the Gap

The fourth industrial revolution (4IR) is characterized by the blurring of boundaries between the physical, digital & biological worlds. It is a fusion of the advances in agricultural innovation systems (AIS) which explains about people, their knowledge, technology, infrastructure and cultures they have created or learned, who they work with, what new ideas they are experimenting with. Examples of AIS are: agricultural drones, artificial intelligence, blockchain technology, Internet of things (IoTs) and automation; Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) and genetic editing (Biotechnology & Nanotechnology).

Precision agriculture is an approach to farm management that uses IT to ensure that the crops and soil receive exactly what they need for optimum health and productivity. The goal of PA is to ensure profitability, sustainability & protection of the environment. Conclusively, new technology solutions, including chemicals and larger tractors, allowed farmers to work larger areas of land with less labour. Government policies encouraged farmers to scale up their operations. Farmers were also motivated by economies of scale-the economic advantage of producing larger numbers of products.

Identifying the latest teeming productive and prolific technology options in agriculture for youths are drones which are mainly employed in following ways: to monitor crops, spray fertilizers and pesticides. They are referred to as unmanned aerial vehicles. This latest trend in agriculture and agricultural technology is revolutionizing the agriculture space by lessening the amount of labour required to propagate a crop.

Women Empowerment and Youth Engagement in Food Chain Security: What fascinates them?

Generally, the youths are fascinated by automation, and yearn to see a more-scientific and technologically-driven agriculture and that specifically factors in the use of robots, drones, and autonomous tractors to make farming more efficient.

Precision agriculture is not left out in the brain re-engineering concept

and reimagination which involves applying irrigation, fertilizers and pesticides at variable rates, depending on crop needs, rather than uniformly applying them at set times, quantities and frequencies. Figures 12.0 to 26.0



Fig 12.0: Garden Design



Fig 13.0: Composting of Green Waste



Fig 14.0: Saving of Seeds



Fig 15.0: Celebration of Natives

presents diagrammatic presentations of sustainable agricultural practices which are invaluable strategies that promotes good ethical measures and inclusivity in both global south and global north economies, as it were.



Fig 16.0: Discouraging Herbicides Usage



Fig 17.0: Employing Beneficial Insects in getting rid of Pests



Fig 18.0: Mulching



Fig 19.0: Trench the Gas - Powered Lawn Mower



Fig 20.0: Plant Trees



Fig 21.0: Conserve Water Resources



Fig 22.0: Fertilize with Manure

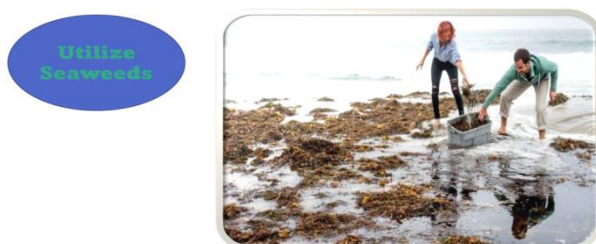


Fig 23.0: Utilize Seaweeds



Fig 24.0: Fertilize with Manure



Fig 25.0: Employ Organic Fencing

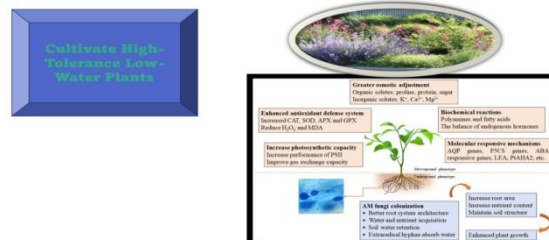


Fig 26.0: Cultivate High-Tolerance Low - Water Plants

Addressing the Perception Issues: Enabling Policy Options

Addressing the outdated perception and mindset issues towards food chain security is crucial for an active participation in the sector. This unique approach aims to leverage the power of the mind, talent, values, ethics and technology to drive sustainability and change the misconceptions surrounding inclusivity and inclusiveness in food chain security

initiatives. The BRE strategy hinges on the 5 pillars which can provide a robust framework for promoting ethics, values and inclusivity in FCS which aligns with the United Nations' 17 Sustainable Development Goals.

FCS is not merely a traditional or peripheral subject, but a primary sector that forms the bedrock for all other sectors to thrive. Recognizing this, the BRECR offer an innovative pathway to navigate the teeming bottlenecks faced by the global north and south nations (Agbugba, 2023).



Fig 27.0: Fostering enabling Policy and Institutions

From Figure 28.0, fostering enabling policy and institutions is essential in promoting ethics, values and inclusivity in FCS initiatives from the following ways which are: reshaping supply chains, food retail, marketing and procurement; innovative finance to leverage on public and private sector investments; climate-resilient and low-emission practices and technologies; digitally-enabled climate-informed services; and

empowering farmer and consumer organisations, women and youths.

It is pertinent to underscore that food which is one of life's priority needs is of great essence and a major driver to the functioning of industries, a generator of foreign exchange earnings, among other roles interconnected to it. BRE is believed to benefit educational programmes in setting exemplary precedence. By promoting the right ethics, values and inclusivity, a new generation of entrepreneurs in FCS can drive sustainable practices, thereby contributing to the global economy.

Food Systems Transformation: What's in the Policy Toolbox Research?

Policies have been described as the 'control knobs' that can be adjusted to achieve system change. Understanding which policies do, or could, influence food systems is therefore an important part of catalysing transformation. But information about food systems policy levers tends to be fragmented across different policy sectors or disciplines, with no overarching picture of the available options and their relationships to one another. This research, published in October 2021, generated a map of policy levers organised by food supply chain segment and developed a taxonomy of broad types of policy lever. Because of the importance of considering the overall coherence of the policy approach to food systems, the project also explored the relationship between different policy levers. The findings begin to document in one place what

we know about how these different food systems policy levers impact on one another, or 'interact', and where particular mixes, or 'policy packages' of levers are being used in combination.

Rebranding Agriculture in Africa: Can this Work in Other Continents?

Young professionals have fresh ideas, a strong grasp of emerging trends and are up for the challenge of trying new approaches to work with food security and nutrition. To mobilize greater innovation in the agricultural sector, insight from today's youth is needed; young people must be instrumental in creating their own future. Realizing this significance of youth role, several organizations are prioritizing the youth empowerment and involvement in agriculture, might it be research, academic or extension.

Brain Re-Engineering Concept: Youth-Focused action-based Solution

Gain multidisciplinary skills by becoming involved in setting-up an enterprise (learning and doing). It will increase, as well as ensure the likelihoods of entrepreneurial success in other areas.

Find out how the youths can gain leverage over game-changing technological solutions (not available to past generations), as well as gain the entrepreneurial skills to drive a sustainable change in the industry.

As soon as they set-up an enterprise, find out the interested players who will adopt and improve sustainable practices that can mitigate the effect of climate change in ways

that drives values proposition and profitable business ventures.

Youths will stand a better chance when they gain market advantage in both developed and developing societies and will become successful operators/managers in the many professional areas that the agribusiness sector encompasses.

Brain Re-Engineering Concept: Young Professionals for Agricultural Development

To mention, Young Professionals for Agricultural Development (YPARD) has been always fostering young professionals through mentoring and inclusion of youth's views in policy making.

Some initiatives carried forward by an Indian research agency, a country branch of YPARD, such as online and on-site mentoring to connect academics with farmers, information stall at food fair to advocate on importance of nutrition.

Also it is pertinent to advocate on Student Research Symposium to encourage them on agriculture and nutrition, etc. are worth explaining the role of youth towards food security and nutrition.

Conclusion

In conclusion, youth engagement in food chain security initiatives is essential and critical for growth and to strengthen local food systems, feeding communities and providing gainful employment opportunities for the world's booming youth population. Entrepreneurship in FCS offers a transformative opportunity to

generate income, create jobs, and establish multiple sources of livelihood. The role of youths in digital agriculture is streamlined in such a way that automated workflows have become invaluable for teams in the agriculture industry. FCS and entrepreneurship not only generates decent work opportunities but also strengthens communities and drives inclusive economic growth. It is of great essence to bridge the gap to provide avenues for youth to embark on food chain security initiatives. One of the striking merits in unlocking BRECR at a young age is the opportunity to acquire valuable skills such as teamwork, networking, problem-solving, critical thinking, innovation, and self-discipline, cultivated through entrepreneurship, have far-reaching benefits. These values, skills, ethics contribute to improved performance in academics and become invaluable assets and make for inclusiveness, as well as inclusivity throughout life.

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Social Media Use and Self-Esteem as Predictors of Body Image Dissatisfaction among Young Adults in University of Nigeria, Nsukka

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Abstract

Constant interaction with peers and exposure to online and offline media can influence one's apparent discontent with one's body parts. Such body discontentment has currently generated a lot of research interest demanding further exploration. Using a cross-sectional design, this study investigated the predictive role of social media use and self-esteem on body image dissatisfaction. The sample comprised of 542 (25.6% male and 74.4% female) young adults in the University of Nigeria, Nsukka, whose ages ranged from 18-29 years ($M = 21.84$, $SD = 2.77$). They were recruited using convenience sampling technique. Social Networking Usage Questionnaire (SNUQ), Rosenberg Self-Esteem Scale and a combination of the Appearance Evaluation (AE) and the Body areas Satisfaction Scale (BASS), subscales of the Multidimensional Body-Self Relations Questionnaire–Appearance Scales were used to measure social media, self-esteem, and body image dissatisfaction, respectively. The results of multiple regression analysis showed that social media use was a significant positive predictor of body image dissatisfaction ($\beta = .56$, $p < .001$) while self-esteem was not. These results suggest that unchecked use of social media might lead to adverse consequences and a harmful approach to body care.

Keywords: Body image dissatisfaction, self-esteem, social media, young adult, gender.

Introduction

Young people frequently experience body dissatisfaction and distorted body images (Pradeilles et al., 2022). Young people's social circles change when they graduate from high school and enroll in universities. There is an

increased social interaction with people from various walks of life. At this developmental stage, young people are exploring their social identity and are more conscious of various parts of their bodies. They are constantly comparing themselves with

significant individuals around them, and are impacted by any perceived shortcoming in their body. These insights could occasionally result in body dissatisfaction.

The term "body image" refers to an individual's perception, feelings, and ideas about their physical appearance. It is a person's perceptual, attitudinal and behavioral disposition towards one's physical self (Cash, 2000). Body ideals, which are mostly propagated by the media, family, and peers, are what create the perspective of one's own body (Jiotsa et al., 2021). It is believed that a perceived difference between one's desired ideal state of the body and one's actual physical appearance—that is, one's real body image—is the root cause of body image dissatisfaction (BID). Pradeilles et al. (2022) defined BID as a negative attitude towards one's physical appearance. Body image dissatisfaction also includes body part discontentment, which is defined as being unhappy with one's size or form of one's body parts, including sex and sexual organs (Mohamed & Idrees, 2023).

Research on body image perception revealed varying prevalence rates of body image dissatisfaction among young people: 51% in Iran (Alipour et al., 2015), 48.1% in Malaysia (Kamaria et al., 2016), and 73.6% in Saudi Arabia (Assaedi et al., 2016). These findings were based on studies conducted in Asia. According to a study conducted in Nigeria, 82.9% of students in public and private secondary schools in

Benin, Edo State, expressed unhappiness with their bodies (Otakpor&Ehimigbai, 2016). In addition, a recent study conducted in Lagos among undergraduate students discovered a 63.5% rate of body image dissatisfaction (Olatona et al., 2023).

Various research investigated the association between negative body image and other psychological variables, such as depression (Soares-Filho et al., 2020; Jiménez-Limas et al., 2022), suicidality (Aquil et al., 2021), sleep quality (Balshill& Wilhelm, 2014), and unhealthy weight control behaviours (Flores-Cornejo et al., 2017). Crow et al. (2008) suggest a direct connection between eating disorders and body image dissatisfaction. The majority of this research focused on the relationship between health-related factors and BID. But as social media has grown over the past 20 years, a new potential risk factor for BID has surfaced.

Undergraduate students use social media sites like Facebook, Instagram, and TikTok as media to express themselves to the outside world. Consequently, these platforms have become more crucial in shaping young people's self-perceptions regarding their physical appearance. Due to the proliferation of social media influencers and celebrities, many beauty influencers are endorsing their views on "positive body image," which establishes unattainable standards of beauty for society (Aw & Raheem, 2023).

Students who connect with social media through comments likes, and

shares might become fixated on how they are viewed on the platform in an attempt to gain more recognition and validate conventional beauty standards. Regular interaction in social media may increase the degree of body image dissatisfaction since it exposes users to the ideal appearance regularly. They may become influenced by this to use filters and photo processors to make themselves appear and feel perfect. To meet society's ideals for beauty, a person may also have plastic surgery, engage in risky weight-loss behaviours, use weight-management products like steroids or slimming tablets inappropriately, and endure several other risky operations (Vuong et al., 2021). According to Brazier (2020), these norms may lead to the development of potentially lethal societal problems like physical and cyberbullying, mental health problems like anxiety, despair, and low self-esteem, and eating disorders like bulimia and anorexia nervosa. Such resultant social problems make it important to recognize young adult body dissatisfaction because of the primary, potentially fatal, consequence of this problem.

The link between social media and BID exists in the literature. Studies suggest that social media usage, particularly when it involves appearance comparisons, is associated with body image dissatisfaction across various demographics, with factors like thin-ideal internalization, social physique anxiety, and sociocultural influences contributing to this

dissatisfaction (Bilal et al., 2021; Nagl et al., 2021; Hashim et al., 2022). These studies were all conducted in the Western and Asian countries, thus creating a significant gap in the literature regarding African context. It is also important to investigate undergraduates' attitudes to self as this may also play a role in BID. A possible construct that stands out in relation to this is the self-esteem. Self-esteem can be classified as high and low, based on an individual's assessment of their own value, self-worth, and level of confidence in themselves. Individuals with high self-esteem value and regard themselves as noble, comprise the first category whereas individuals with low self-esteem are still figuring out who they are and what they can do make up the second group (Jhangiani & Tarry, 2022). Several ideas contend that preserving or enhancing one's sense of self-worth is an essential human need (Bergagna et al., 2018).

Self-worth and self-esteem are closely linked to traits like determination, self-assurance, inventiveness and decision-making ability, creativity, sanity, and mental well-being (Noronha et al., 2018). It also describes a person's perception of their own value or worth, or how much they esteem, approve of, prize, or like themselves. Numerous research have demonstrated that people who are overweight or obese have worse self-esteem (Danielsen et al., 2018; Zametkin et al., 2004). According to Coopersmith (1981), there are four main elements that are significant in the development of self-esteem: (i) the

way one is treated and accepted by important people in their lives; (ii) a person's past achievements; (iii) the values and aspirations that shape and interpret one's experiences; and (iv) how one reacts to devaluation.

Numerous studies have investigated the relationship between self-esteem and BID (Sung & Yan, 2020; Uchôa et al., 2020; Eshak et al., 2020; Cai et al., 2021; Qasim et al., 2021; Jones et al., 2022). These studies suggest that low self-esteem is consistently associated with higher levels of body image dissatisfaction across various demographics, including Generation Y men, Brazilian adolescents, university female students, and working women.

In the context of dissatisfied body image, self-discrepancies are significant. They may negatively affect a person's body satisfaction and have an effect on behaviours connected to appearance (such as limiting one's food intake or getting cosmetic surgery) (Vartanian, 2012). For instance, someone who feels that their nose is not as pointed as it should be can be unhappy and think that cosmetic surgery will help to bridge the gap between their perceived ideal and actual/ought selves. Pentina et al. (2009) looked into the connection between young women who wanted cosmetic surgery and self-discrepancy, ages 17 to 29. Through self-report, it was found that people's decisions to have cosmetic surgical treatments done in order to cope with and lessen discomfort related to their appearance can be influenced by how they view

the difference between their ideal and actual selves.

According to Balogun et al. (1992), university students in Nigeria were content with their bodily parts thirty years ago. Research has indicated that a significant number of students (87.4%) have an inaccurate perception of their true body size, leading to a high incidence of body dissatisfaction and likely psychiatric illness (Otakpor&Ehimigbai, 2016; Oyewole et al., 2018). According to studies done on undergraduates in Abia and the Edo States, a significant percentage of students—26.7%—did not feel that their body weight was what they thought it was, and body shape dissatisfaction was common (Otakpor&Ehimigbai, 2016; Ejike, 2015).

Although there are many different factors that contribute to body image dissatisfaction, such as biological, evolutionary, psychological, and sociocultural aspects (Ferguson et al., 2011; Fitzsimmons-Craft, 2011), it has been expected that self-esteem and social media use can predict a variety of higher levels of body image dissatisfaction in teenagers. Concerns over body image are often sparked by the media's excessive exposure to "idealized" body types and skin tones, which is a severe example of how this affects one's self-esteem. Additionally, eating disorders and depression in youth are linked to this body image (Soares-Filho et al., 2020; Flores-Cornejo et al., 2017). According to some research (Scully et al., 2020; Fardouly et al., 2017) social media use

is linked to a positive body image (Cohen et al., 2019), while other studies (Ferguson et al., 2014; Cohen et al., 2017) find no direct relationships between social media use and body image dissatisfaction.

Theoretical Framework

The theory of social comparison accounts for the variables under study. This theory was first put forth by social psychologist Leon Festinger in 1954. According to this theory, people evaluate their own social and personal worth by comparing themselves to those they believe to be doing better or worse. Sometimes people use self-esteem, self-motivation, and self-image enhancement techniques by comparing themselves to others. Because of this, people are continuously evaluating both themselves and other people in a variety of areas, such as success, IQ, wealth, and attractiveness. Additionally, these evaluations may promote prejudiced, judgmental, and unduly competitive or superior attitudes (Festinger, 1954). Many studies (Hogue & Mills, 2019; Gattario et al., 2020; Jach & Krystoń, 2021) concentrated on the psychological reasons behind negative body image, such as the media, stigmatization and bullying, social and cultural conformity, and so on. A person may feel content or dissatisfied with one or more body parts when they compare their look to that of others. The current study aims to investigate the perceived role of social media (without considering a particular platform) and self-esteem on body image

dissatisfaction in a sample of Nigerian undergraduates.

Hypotheses

Based on the literature reviewed above, the study hypothesised that:

H1: social media would significantly predict body image dissatisfaction among young adult undergraduates of the University of Nigeria Nsukka (UNN).

H2: self-esteem would significantly predict body image dissatisfaction among young adult undergraduates of UNN.

Methodology

Study Design: The study adopted a cross-sectional survey design.

Study Population: A total of 542 undergraduates {139 (25.6%) males and 403 (74.4%) females}, drawn from the population of the University of Nigeria Nsukka participated in the study. The participants were sampled using a convenience sampling technique because only the disposed and accessible students available at the moment of collection participated in the study. The average age of the participants ranged from 18 to 29 years with a mean age of 21.84 (SD = 2.77). Participation was voluntary. 482 (88.9%) of the participants were Christians while 60 (11.1%) were Muslims. 493 (91.0%) were Igbos, 24 (4.4%) were Yoruba, 18 (3.3%) were Hausa and 7 (1.3%) were Efik. What were the Inclusion and exclusion criteria?

Instrument for Data Collection: Three instruments were used in this study, namely the social networking usage

questionnaire (SNUQ), the Rosenberg self-esteem scale (RSES), and the Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS). A demographic questionnaire was used to obtain data containing the participants' gender, age, religious group, and ethnicity.

Social Networking Usage Questionnaire (SNUQ; Gupta & Bashir, 2018)

This 19-item survey employs a 5-point Likert scale, with 5 representing "always" and 1 representing "never," to gauge respondents' usage of social media. 'Social media' was used in place of 'social networking sites' in this study to better reflect its purpose. 'I use social media to become more sociable' and 'I use social media to communicate fresh ideas' are two examples of questions from this scale. Al-Dwaikat et al. (2020) reported good internal consistency reliability for the scale (Cronbach's α for the total scale was 0.88). The alternate form reliability of the SMUIS was also tested by administering the Social Media Use Integration Scale and the Social Networking Usage Scale (Gupta & Bashir, 2015) to the same sample and the correlation coefficient had a high positive value ($r = .95, p < .001$). For the current study the items yielded a high internal consistency reliability, Cronbach's alpha of .90.

Rosenberg Self-esteem Scale (RSES) (Rosenberg, 1965)

One of the most used tools for self-esteem study is the 10-item Rosenberg self-esteem scale, which consists of five positively and five negatively worded questions. Responses to the items are given on a 4-point Likert scale, with

strongly disagree (1) and strongly agree (4) being the possible outcomes. The scores range from 10 to 40. Higher scores indicate high self-esteem, while lower scores indicate poor self-esteem. This scale has questions like "I am able to do things as well as most other people," "I certainly feel useless at times," "I am satisfied with myself overall," and so on. To achieve uniformity in scoring, the negatively phrased items (2, 5, 6, 8, and 9) were scored in reverse. Rosenberg (1979) reported that RSE demonstrates a Guttman scale coefficient of reproducibility of .92 and a test-retest reliability over a period of 2 weeks reveals correlations of .85 and .88. The scale yielded a high internal consistency reliability for the current study with a Cronbach's alpha coefficient of .84.

Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ-AS; Cash, 2000)

A self-report questionnaire with 9 items was used to evaluate several elements of body image connected to appearance. This is measure, scored on a 5-point scale with anchors 1: strongly disagree and 5: strongly agree, addressing issues of valuing and attending to one's appearance as well as engaging in appearance-management (or grooming) behaviors. Sample items are: "I try to be as physically attractive as I can be" and "I have never paid much attention to what I look like." The scale has a lowest total score of 20 and a highest total score of 100. Reverse scoring was used for the final two (bolded) items on the Appearance Evaluation scale.

The developers reported good internal consistency (Cronbach's $\alpha = .90$) (Cash, 2003). Argyrides & Kkeli, (2013) reported that the internal consistencies of the subscales ranged from .76 to .86. Test-retest reliabilities ranged from .75 to .93 while convergent validity was also confirmed as the Greek MBSRQ-AS subscales correlated positively with the ASI-R and the SATAQ-3. For the current study, the items yielded a Cronbach alpha of .89.

Method of Data Collection

The scales were hand-distributed by the researcher to various undergraduates in the University of Nigeria, Nsukka in various settings (classrooms and hostels). The researcher explained the nature of the study to the participants, what they were required to do, and who was undertaking the research. Each section in the questionnaire had clearly stated instructions on how it should be completed. Participation in the research was voluntary and no incentives for participation were given. Some questionnaires were completed immediately while the researcher had to come back for some. A total of 570 copies of the questionnaires were distributed out of which 559 were returned. Seventeen (17) copies were

improperly filled or mutilated, leaving a total of 542 valid copies of the questionnaires which were analysed showing a 95% completion rate.

Data and Statistical analysis

The study made use of descriptive statistics (mean and standard deviation), Pearson's correlation and hierarchical multiple linear regression which was used to test the study hypotheses. The hypotheses were tested under the 95% level of significance ($p < .05$).

Results

This section presents the results of the data analyses. Table 1 showed the correlations between the demographic variables and the main study variables. Age was negatively associated with being male ($r = -.26$ $p < .001$). Social media use associated positively with body image dissatisfaction ($r = .56$, $p < .001$). The mean score of 57.20 indicates a moderate level of the social media use. The participants had a moderate level of self-esteem as shown by the mean score of 21.69. In respect to body image dissatisfaction, the mean score of 27.18 was obtained indicating a slightly high level of it among the participants.

Table 1: Pearson's correlations of demographic variables, social media, self-esteem, and body image dissatisfaction among young adults.

	Variables	Mean	SD	1	2	3	4
1	Age	21.84	2.77	-			
2	Gender	-	-	-.26***	-		
3	Social Media	57.20	15.51	.03	-.01	-	
4	Self-Esteem	21.69	4.35	.03	-.01	.06	-
5	Body Image Dissatisfaction	27.18	8.93	-.00	-.02	.56***	-.02

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; Gender (1 = male, 2 = female); Social Media (Range = 19-95); Self-esteem (Range = 10-40); Body Image Dissatisfaction (Range = 9-45).

Results of the hierarchical multiple regression for the test of the hypotheses is shown in Table 2. In Step 1, age and gender were added as control variables. Gender was not a significant predictor of body image dissatisfaction among young adults, $\beta = -.03$. Age was not a significant predictor of body image dissatisfaction among young adults, $\beta = -.04$. The model was not significant, $F(2, 529) = .17$, $R^2 = .00$. The R^2 of .00 indicated that 0% of the variance in body image dissatisfaction among young adults was explained on account of the control variables.

In Step 2, social media was a significant positive predictor of body image dissatisfaction among young adults, $\beta = .56$, $p < .001$. The B showed that for each one unit rise in social

media, body image dissatisfaction among young adults' increases by .32 units. The model was significant, $F\Delta(1, 528) = 238.56$, $R^2 = .31$. The $R^2\Delta$ of .31 indicated that 31% of the variance body image dissatisfaction among young adults was explained by social media.

In step 3, self-esteem was not a significant predictor of body image dissatisfaction among young adults, $\beta = -.05$. The model was not significant, $F\Delta(1, 527) = 1.61$, $R^2\Delta = .00$. The $R^2\Delta$ of .00 indicated that 0% of variance in body image dissatisfaction among young adults was explained by self-esteem. All the variables in the study explained 31% of the variance in body image dissatisfaction among young adults.

Table 2: Hierarchical multiple regression predicting body image dissatisfaction among young adults by social media and self-esteem, with age and gender as control variables

Predictors	Step 1			Step 2			Step 3		
	<i>B</i>	β	<i>T</i>	<i>B</i>	β	<i>t</i>	<i>B</i>	<i>B</i>	<i>t</i>
Age	-.04	-.01	-.25	-.06	-.02	-.51	-.06	-.02	-.47
Gender	-.52	-.03	-.57	-.35	-.02	-.45	-.34	-.02	-.45
SM				.32	.56	15.43***	.33	.56	15.48***
SE							-.09	-.05	-1.27
R^2		.00			.31			.31	
$R^2\Delta$.00			.31			.00	
<i>F</i>		.17 (2, 529)			79.54 (3, 528)***			60.11 (4, 527)***	
<i>F\Delta</i>		.17 (2, 529)			238.56 (1, 528)***			1.61 (1, 527)	

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; SM. = Social Media; SE = Self-esteem

Discussion

The study examined the predictive role of social media and self-esteem on

body image dissatisfaction among the undergraduate students of University of Nigeria. Two hypotheses were

tested; the first hypothesis which stated that social media will predict body image dissatisfaction was confirmed. The results revealed that social media positively predicted body image dissatisfaction among the undergraduate students of the University of Nigeria. This aligns with previous studies (e.g. Jiotsa et al., 2021; Tadena et al., 2020; De Vries et al., 2019). Alruwayshid et al. (2021). On the other hand, Vuong et al., (2021) a study did not corroborate with our findings.

This finding also makes sense considering Festinger's (1954) social comparison theory. In this instance, college students use comparisons to judge their own social and personal worth in relation to those they believe to be doing better or worse. For example, utilizing Instagram, a social media network mostly used for posting photographs and videos, exposes users to those who are thought to lead better lives. Feelings of dissatisfaction with one's physical appearance are likely to result from an inability to manage the pressure of these exposures.

The second hypothesis tested in the study was not confirmed. The result indicated that self-esteem did not predict body image dissatisfaction. Thus, having high or low self-esteem does not necessarily matter in getting discontented with one's body part or structure. High self-esteem individuals might not feel the need to measure themselves against others. Therefore, even if there are differences between one's self-state and another, someone

with a high sense of self-worth might not notice them and might not be as prone to body image issues. Individuals with strong self-esteem are also aware that having negative thoughts about their physical appearance is a decision, and they will make an effort to avoid thinking about it. Also, the findings suggest that people who have either high or low self-esteem may not necessarily bother about what their body looks like since there could be other factors that will determine this feeling. Their level of self-esteem may play a role in other day-to-day activities like interaction with people.

Implications of the Findings

The findings of the study have been able to demonstrate that social media significantly and positively predicted body image dissatisfaction among the undergraduate students of University of Nigeria, Nsukka. This implies that the more social media is used among the undergraduate students, the more the discontent with some or all of their body parts. This might also explain the proliferation of tinted hair, craze for muscles and six packs among male students and an obsession with certain body shapes among females etc. in the university community. Similarly, this occurrence is most likely to spill over and extend to other places outside the higher institution. Among other challenges, other youth are likely to create avenue for the transmission of the behaviour as it continues to spread among the undergraduates.

Limitations of the study

There are several restrictions on this study. For example, the study setting appears to restrict how broadly the results may be applied. Furthermore, a significant portion of the samples come from the Igbo extraction, which makes generalization challenging. In this study, the ratio of male to female participants was quite large. Causal implications cannot be drawn from this study's cross-sectional design, which uses self-report measurements. The impact of moderating or mediating variables, such as social support and emotion control, was not investigated in this study.

Recommendation for Further Research

It is possible that participants who are addicted to social media see their daily tasks as less demanding and of a lesser nature. Therefore, future studies should increase the sample size significantly to obtain a robust data set and diversify the samples across different geopolitical zones, institutions, and ethnicities in order to maximize generalizability. It is important to look at variables like emotion control and social support as mediators in these interactions. This will provide more depth and insight into the findings.

Conclusion

The advent of social media has brought a craze for body modification and the need to feel among; caused by a discontent with current body states, especially among the undergraduate students and by implication the youth. This calls for urgent attention to

reorientation of the youth on the inherent risks involved in use of social media. Since self-esteem did not predict body image dissatisfaction, it therefore means that whether self-esteem is high or not does not matter in how people rate their bodies. This suggests that there could be other factors which would affect the way people see their bodies.

Recommendations

Parents and guardians should encourage their wards to unsubscribe from any social media platforms or accounts that make them feel inferior about themselves and follow more social media platforms that boost self-confidence instead. Business owners can also key into these findings when running ads. They should avoid making people feel less of themselves by making it appear that if you are not light-skinned you are not beautiful or if you're not thin, you are not healthy.

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Concept Maps for Elasticities of Demand and Supply: Online Resources for Economics Students

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Abstract

Online resources are gaining momentum across the education setting due to technological advancement and the recent COVID-19 pandemic. This has resulted in the use of different tools and strategies in providing educational resources for today's technology-driven learners. Technology-based learning resources tend to capture learners' interest in this digital age. Therefore, this study provides concept maps as online resources for Economics students. A concept map is a knowledge representation in the form of a graph comprised of boxes connected with labeled arcs showing the relationships among concepts and ideas. The study was an exploratory survey study with two objectives constructing online concept maps and determining students' views on the constructed maps. The area of the study was Nsukka Local Government Area. The population was 2,389 SS2 Students from the 32 secondary schools in Nsukka LGA. The sample size was 120 SS2 Economics students using a simple random sampling technique. The instrument for data collection was a rating scale titled 'Rating Scale on Concept Maps for Elasticities of Demand and Supply (RSCMEDS)'. Mean scores and standard deviation were used for data analysis. Findings showed that students' views on the constructed online maps were positive. The students were of the view that the online resources suit their digital need (mean = 3.09) and that the resources are easy to read and understand (mean = 2.90). The researcher believes that the online concept maps resources will serve as better alternative to traditional lecture method used mainly in schools. And thus, they will help to promote students' interest and achievement in learning the mapped contents in Economics.

Keywords: Online resource, Economics, Concept maps, Elasticity of Demand and Supply.

Introduction

Economics is concerned with the study of what is to be produced, who gets what is produced, how much, and

how the production will be carried out. It is all about making choices in the face of numerous alternatives. Hall (2013) defined Economics as the study

of how individuals, firms, and whole societies identify their most important needs and allocate and manage scarce resources in such a way that satisfies as many needs as possible. Economics is, therefore, seen as a subject or course that studies human actions in relation to scarce resources and unlimited wants. Economics is a subject that enables students to make smart choices and proper resource management in the face of scarcity. Accordingly, Mohammed and Pitau (2022) noted that with the knowledge of Economics, graduates should have acquired relevant functional economic skills needed for poverty eradication, job creation, and wealth generation.

Economics helps one to become a useful citizen. Yusuf, (2012) asserted that understanding Economics is a prerequisite for good citizenship which involves the ability to make rational decisions on important economic issues with a good basis for doing so. Exposing students to an Economics curriculum will make them better equipped with the right knowledge, skills, and attitudes that will keep them focused on maximizing their economic potential and thus stay off unethical practices. Accordingly, Ojo and Nkoyane (2016) noted that the purpose of economics is to create future responsible citizens, effective decision-makers, and voters for change. Therefore, the level of Economics knowledge of a student will determine their ability to solve economic problems and make rational decisions concerning society.

However, there seems to be poor achievement of students in the subject despite its importance. West African Examination Council (WAEC) Chief Examiner's Reports from 2017 through 2019 revealed that students' achievement in Economics has been consistently poor (WAEC, 2017, 2018 & 2019). In 2023, the Chief Examiner reported that quite a good number of candidates showed great deficiency in the interpretation of graphical representations of economic concepts which resulted in poor performance in questions where such ability was required.

From the foregoing, it is only wise then to provide resources that will cater for students' enhanced understanding of Economics concepts and topics with graphical representations and interpretations. Among such concepts and topics with graphical representations are elasticity of demand and elasticity of supply. The elasticity of demand is the degree of responsiveness of demand for a commodity to changes in the price of the commodity, another commodity or income. On the other hand, the elasticity of supply is the degree of responsiveness of the supply of a commodity to changes in price. These two topics in Economics have lots of graphical connotations, illustrations, and representations. Based on this, the researcher believes that the graphical nature of concept maps will be a good match for their representations in a technological or online environment to capture the interest of today's technology-hungry and driven

learners. Therefore, the paper provides concept maps on elasticities of demand and supply as online resources for Economics students.

Technology has changed the whole pattern of human life. One of the greatest contributions of technology is the development of computers and their use in all walks of life. Using computers in education is now gaining momentum. Technology seems to be driving and redirecting education and its mode of delivery. Recognizing the place of technology-enhanced learning, the Federal Government of Nigeria (FGN) (2013) in the National Policy on Education, section 5 noted that for effective functioning in the modern world, there is a need to integrate information and communication technology (ICT) into education in Nigeria. The need for computers in education has increased following the challenges brought by the COVID-19 pandemic. Accordingly, Oltean (2021) noted that the single solution to continue the educational activity after the suspension of onsite activities due to COVID-19 was represented by the transition towards the use of online educational delivery and resources. In this study, therefore, online resources are the presentation of curriculum contents for students through technologies made available on the internet.

Online resource is the availability of learning materials for students through the internet. With online resources, students are provided with the website(s) they need to visit to get a given task done. Khan et al. (2012)

referred to online resources as a hypermedia-based instructional programme that utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported. Online resources describe any form of material delivered using digital technology that incorporates visual graphics, text, animations, videos, and audio (Basar et al., 2021). Online resources promote access to information for a wide range of students irrespective of location. Students across the globe can easily access the information.

The online resources in the study are made available with concept maps. A concept map is a visual representation of knowledge by showing the relationship(s) between concepts and ideas using computer software. By drawing a concept map of a material, say a chapter in a textbook, a learner can identify the key concepts and show the relationships between them. This helps him/her to understand more clearly the meaning of the material. Concept map is a way of representing knowledge as a set of concepts and the relationships between the concepts in graphical formats (Canas et al., 2017). Safayeni et al. (2013) defined concept map as a knowledge representation tool in the form of a graph comprised of boxes connected with labeled arcs. Concepts are located inside the boxes or circles, and relationships between different concepts are specified on each arc creating a proposition. A significant

variation of a proposition is a crosslink, which shows the relationships between ideas in different segments of the map; and propositions (node - link - node triads) are a unique feature of concept maps, compared to other similar graphs (Safayeni et al., 2013). In concept maps, abstract concepts are presented in a concrete way; the relationship between concepts and facts are clarified, and new information are connected to prior knowledge in order to make meaningful learning.

A concept map provides a common denominator between visuals and thought and between the mind and the pictures (Mashhadiet al., 2021). Concept map has been increasingly promoted to facilitate thinking in complex situations as it represents cognitive structures and processes in visual formats that amplify, extend, and enhance human cognitive functions and engage learners as they represent and reflect on what they know (Wang et al., 2018).

Constructing a concept map involves several steps. Sundar (2022) has six steps for constructing concept maps. For Sundar, the first step in constructing a concept map is the focusing stage which deals with selecting a topic or theme. This is followed by the brainstorming stage which deals with getting informed on the topic through reading materials to know the selected topic/theme and associated concepts or ideas and making a list of these ideas or concepts. The third step in Sundar's

steps for constructing a concept map is the organizing stage dealing with the placement of similar or more related ideas/concepts close to each other. The fourth stage is the layout stage which entails the use of lines and arrows to connect the concepts and show the directional relationships among the concepts. The linking stage which is the fifth step is on labeling the arrows using linking words and phrases to link them to the concepts. The final step for Sundar is the revisiting stage which is on removing any redundant concepts or ideas if they lack any relationship or placing them accordingly if they still fit in the map and adding any additional concepts that fit in the map and making cross links (Sundar, 2022).

These steps/stages align with the guidelines on constructing concept maps given by Johnston (2013:3) as follows:

1. Select and read a chapter in a textbook or a set of lecture notes on a particular topic, highlighting the important points and ideas when going along.
2. After reading and highlighting, identify the key concepts necessary for understanding the topic and make a list of their names.
3. Decide which concept (or concepts - there may be more than one) is the most important or most inclusive idea and make a list with this concept at the top. Find the next most general concept and write it next. Proceed to rank or cluster the remainder of the concepts from most

- inclusive or most general to least inclusive or most specific.
4. Begin constructing a concept map by placing the name of the broadest, most inclusive concept(s) at the top of a piece of paper. Work down, adding more specific concepts. Sometimes these may be located alongside each other like brands of detergent on a supermarket shelf; sometimes it is most sensible to have them in descending order, one above the other. Enclose each term in a box or circle.
 5. Join the concepts with lines and label the lines with linking words that show meaningful connections between the concepts. As a first step, formulate the word or words that accurately describes, according to the text reading, the relationship between the super-ordinate concept and the subordinate concept related to it. These are the linking words. The learner (mapper) should try to be economical in formulating these links. Linking concepts is the most important aspect of concept mapping. Here are a few examples of linking words used to describe relationships: composed of, includes, depends on, is influenced by, causes, and is affected by.
 6. Finish mapping in all the concepts in the list (see Step 1 above). Continue to make the map grow by relating additional concepts from the list to concepts already on the map. Continue with the more 'inclusive' terms first, working down to the most specific terms until all the concepts are mapped in.
 7. Now study the map to see if there are any other relevant relationships that should be illustrated between terms on the map. Such relationships, if they exist, may take the form of cross-links. Cross-links are relationships that exist between two concepts in different vertical segments of the concept map. Cross-links help to integrate a concept map into a cohesive whole. Cross-links can be constructed at any point in the mapping process. In fact, the learner will often identify cross-links when only some of the terms have been mapped. Such cross-links may be forgotten if not mapped in at that point.
 8. When the concepts are linked together to form a cause-effect relationship an arrow is used to show the direction of the relationship. Not all links need to be one-way. Look for examples of two-way interdependency (sometimes it might be indirect, that is, via another concept or concept - and is best shown by a series of cross-links).
- These steps for constructing a concept map can be summarized in four simple steps. They are the selection of a topic; generation of related concepts/ideas; linking concepts/ideas with arrows and the linking words/phrases to show the relationships, and revision. Looking at the steps for constructing a concept map, it can easily be observed that when mapping concepts, the mapper is bound to make some alterations, modifications mistakes and have them corrected. Making these

corrections could be very frustrating and cumbersome when concept maps are done manually. A manual concept map is a concept map constructed using pen and paper. Pen and paper or manual concept maps are difficult to revise (Chang et al., 2016). Constructing concept maps manually could be messy and wasteful because one keeps erasing and/or turning pages of physical papers to accommodate changes in the maps. This then necessitated the construction of concept maps in a computer environment for easy revisions leading to the online concept maps.

Objective of the Study

The main objective of this study was to provide online concept maps on elasticity of demand and elasticity of supply contents in the Economics curriculum. The specific objectives of this study were:

1. To provide concept maps as online resources for Economics students.
2. Find out students' views on the online concept map resources.

Methodology

Study design: This study was an exploratory survey study. The study constructed online maps and sought the views of some learners on the maps. The concept maps are constructed with a Cmap-free concept mapping tool from the Florida Institute for Human and Machine Cognition (IHMC). There are three concept maps for the elasticity of demand due to the robustness of the topic while the elasticity of supply has one map. The maps have embedded

annotations and attachments for tables, graphs calculations, and other illustrations.

Population for the Study: The population was 2,389 Senior Secondary School Two Students from the 32 secondary schools in Nsukka LGA.

Sample Selection: The sample size was 120 SS2 Economics students. Using a simple random sampling technique, six schools were sampled from the 32 schools in the LGA. Twenty SS2 Economics students were then sampled from each of the six sampled schools using a simple random sampling technique. This gave a total sample size of 120 Economics students.

Instrument for Data Collection: The instrument for data collection was a rating scale titled 'Rating Scale on Concept Maps for Elasticities of Demand and Supply (RSCMEDS)'. The rating scale has eight items with four response options: Strongly Agree (4 points), Agree (3 Points), Disagree (2 points), and Strongly Disagree (1 point).

Validation and Reliability Test: Both the constructed maps and the RSCMEDS were face-validated by seven experts. Two of the experts are educational technologists, three Economics Educationists, one Measurement and Evaluation expert, and one Software and Multimedia Development expert, all from the University of Nigeria, Nsukka. The RSCMEDS was subjected to a reliability test using Cronbach Alpha reliability estimate using data obtained from twenty Economics SS2 students outside the sampled schools.

RSCMEDS yielded a reliability index of 0.79 which made the instrument reliable for the study due to the high index.

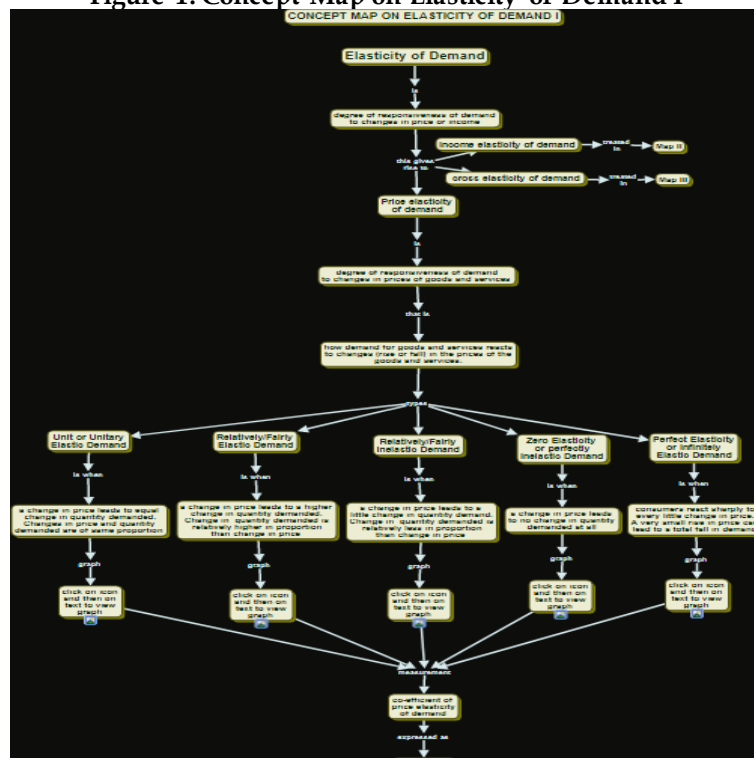
Data Collection Method: The students were exposed to the constructed online concept maps. After this, their views on the online concept maps were sampled using the RSCMEDS. Mean scores and standard deviation were used for data analysis.

Results

Concept maps as online resources for Economics students

The constructed concept maps online resources are presented below in Figures 1-4 with brief descriptions and their online addresses. Figure 1 shows the screenshot of the concept map on elasticity of demand I. The map contains the definition of elasticity of demand, giving rise to price, income, and cross elasticity of demand. It then covers the meaning of price elasticity of demand and its types and graphs. The online map further contains the computation of the co-efficient of price elasticity of demand with examples.

Figure 1: Concept Map on Elasticity of Demand I



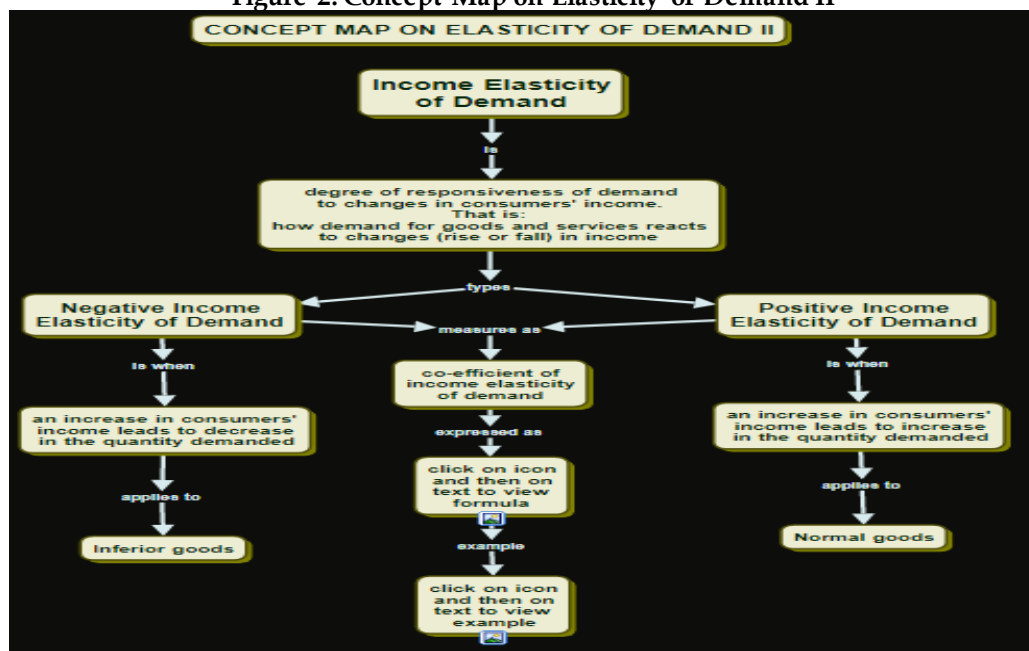
Online Address: <https://cmapscloud.ihmc.us/viewer/cmap/1Z21X1HQR-FQQM45-DTVJWY>

Note: This is just a screenshot and, hence may not be clear and does not have all the information as contained in the online map.

Figure 2 below shows the screenshot of the concept map on elasticity of demand II which contains income elasticity of demand. It covers the meaning of income elasticity of

demand and its types. The online map further contains the computation/calculation of co-efficient of income elasticity of demand with examples.

Figure 2: Concept Map on Elasticity of Demand II



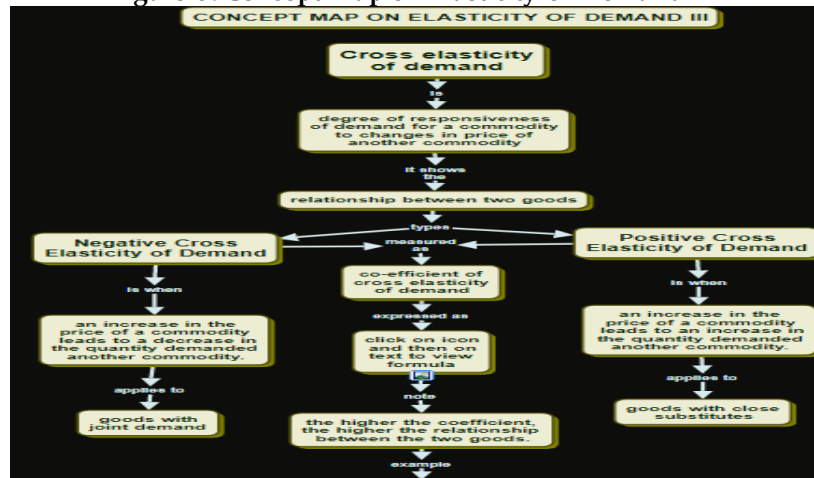
Online Address: <https://cmapscloud.ihmc.us/viewer/cmap/1Z21XVSXG-N77T48-DTYKFK>

Note: This is just a screenshot and, hence may not be clear and does not have all the information as contained in the online map.

Figure 3 below shows the screenshot of the concept map on elasticity of demand III containing cross elasticity of demand. It covers the meaning of cross elasticity of demand and its

types. The online map further contains the computation/calculation of co-efficient of cross elasticity of demand with examples.

Figure 3: Concept map on Elasticity of Demand III



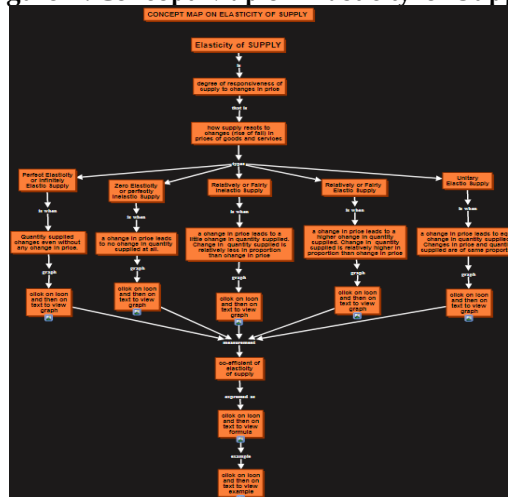
Online Address: <https://cmapscloud.ihmc.us/viewer/cmap/1Z21XWGF9-23S0F97-DTYMB5>

Note: This is just a screenshot and, hence may not be clear and does not have all the information as contained in the online map.

Figure 4 below is the screenshot of the concept map on elasticity of supply. The map contains the definition of elasticity of supply. It also covers the types of elasticity of supply with their

corresponding graphs. The online map further contains the computation/calculation of co-efficient of elasticity of supply with examples.

Figure 4: Concept Map on Elasticity of Supply



Online Address: <https://cmapscloud.ihmc.us/viewer/cmap/1YYVF9RR3-29CW9MR-3M44C7>

Note: This is just a screenshot and, hence may not be clear and does not have all the information as contained in the online map.

Student-Users' views on the online concept maps resources

Table 1 below showed students' views on the online concept maps resources. The data showed that the mean scores of all the items are all above the 2.50 benchmark and the small standard deviations show that the scores are not widely dispersed but close. The grand mean is also above the 2.50 benchmark. This indicates that students' views on the constructed

online concept maps are positive. Top on students' responses are that: the calculations in the online maps are presented step by step (mean = 3.27); the graphs in the maps are well explained (mean = 3.25); examples used in the maps are relevant (mean = 3.22); the online resources suit their digital need (mean = 3.09) and that the resources are useful to their Economics learning (mean = 2.96).

Table 1: Student-users' Views on the Online Concept Maps Resources

Item Statement	Mean	SD	Decision
The online resources suit my digital need.	3.09	0.95	Accept
The resources are easy to read and understand.	2.90	1.13	Accept
They are useful to my Economics learning.	2.96	1.29	Accept
My knowledge of elasticities of demand and supply is enhanced through the resources.	2.82	0.82	Accept
The graphs in the maps are well explained.	3.25	0.78	Accept
The calculations in the maps are presented step by step.	3.27	0.82	Accept
The calculations in the maps are easy to follow.	2.96	0.63	Accept
The examples used are relevant.	3.22	0.80	Accept
Grand Mean	3.06	0.31	Accept

Discussion

This study constructed, documented and validated concept maps for elasticities of demand and supply as online resources for Economics students. Students' views on the online resources were highly positive. Students were of the view that the online resources suit their digital need, are easy to read and understand, useful to their Economics learning, and enhance their knowledge of elasticities of demand and supply. They also believed that the graphs in online concept maps were well explained, the calculations were presented step by

step and were easy to follow, and that the examples used are relevant.

The findings made in this study could be explained by the fact that today's learners are technologically driven. Any introduction of technology in their learning process seems to lighten up their mood and boost interest. This is in support of the position of Kutlu and Menzi (2013) that online delivery attracts the interest and provides the needs of the learner. With the current crop of learners in this digital era, having online instruction makes the teaching and learning process readily acceptable by

students. Online activities seem to be an inseparable part of the daily lives of the digital learners. The online concepts maps in this study are a way of giving students the opportunity to learn with technology, hence, their positive views on the online resources. Accordingly, Uygur (2019) observed that the digital learners get motivated more easily in the lesson when the methods containing technology are used in their learning environment. In line with the findings of this study, Vitoria et al. (2018) in a study on students' perceptions on the implementation of e-learning revealed that all students were of the belief that the e-learning module they took was useful, stating that they understood information given. Furthermore, Faloye and Obateru (2021) reported that utilizing virtual instructional tools is pedagogically efficient as they serve as a boost for students' learning outcomes.

Conclusion

The researcher concludes that the provision of online resources is useful and suitable for Economics students and believes that if integrated into the teaching and learning process, these online concept maps will help increase students' interest in learning the mapped topics in Economics and subsequently enhance their achievement in those areas. This will also help when there is a need for reduced physical contact among teachers and learners as was the case during COVID 19 pandemic.

Recommendations

Based on the findings and discussions so far, the researcher recommends the following:

1. Economics teachers should use the online concept maps in their teaching of the mapped topics.
2. Ministry of Education through the relevant bodies should include the links for the provided resources in Economics curriculum.
3. Economics teachers and related curriculum developers should construct and provide online concept maps in other contents in Economics.

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Effects of Sun Drying, Shade Drying, Blanching and Cooking on the Nutrient Composition of Turmeric Rhizome (*Curcuma longa*)

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Abstract

The study determined the effect of sun drying and shade drying on the nutrient composition of turmeric (*Curcuma longa*). Two kilograms of fresh turmeric rhizomes were purchased from a local market (Ogige) in Nsukka Local Government Area of Enugu State. The samples were trimmed and thoroughly washed under running water to remove debris, peeled, and thinly sliced. The sample was divided into two portions. The first portion was sundried while the other portion was shade dried. The two samples were processed into powder and packaged in a well-labeled airtight container for analysis. Association of Analytical Chemists and other analytical methods were used to determine the nutrient composition of the samples. Data were analyzed with Statistical Product for Service Solution (version 22) using ANOVA and Duncan's New Multiple Range test at $P < 0.05$. The findings of the study revealed that the sun-dried sample had the highest value for carbohydrate (55.51%), ash (8.03%), and moisture (18.50%) while shade dried sample had the highest protein (8.61%) and fat (7.21%). The raw shade-dried sample had the highest values for Beta carotene (20.10 mg/100g) and Vitamin C (3.60mg/100g), while the boiled sun-dried sample had the highest values for potassium (40.82mg/100g), iron (9.79mg/100g) and calcium (595.7mg/100g). Therefore, sun-drying and shade-drying processing methods on the turmeric should be encouraged as they conserve more nutrients.

Keywords: Nutrients composition, turmeric, sun drying, shade drying,

Introduction

Turmeric (*Curcuma longa*) Linn is a tropical perennial monocotyledonous herbaceous plant belonging to the Zingiberaceae family (Jilani et al., 2012). It has its origin in the South and South-eastern Asia but it is grown primarily in tropical regions of

Bangladesh, China, Thailand, Cambodia, Malaysia, Indonesia, Philippines, and Nigeria (Taoheed et al., 2007). The root or rhizome of turmeric has a tough brown skin and bright orange flesh which is pungent and bitter (Ahaotu & Lawal, 2019). It has been applied in folk medicine for

the treatment of inflammations, cancerous symptoms, diabetics, abdominal pains, high cholesterolemia, and wounds and as a blood purifier (Ahaotu & Lawal, 2019). They are known to contain a significant number of natural antioxidants and bioactive components (Singh & Dubey, 2015). The rhizome of turmeric when dried and ground can be used as a spice ingredient in food preparation for flavouring, colouring, and preservation of food (Jiang, 2019).

Curcumin which is a yellow-colored active ingredient is a potent antioxidant responsible for the biological activities of turmeric. Curcumin also contains vital compounds such as vitamin C, beta-carotene, polyphenol, fatty acids, and essential oil (Ikpeama et al., 2014). Turmeric is used as a carminative. It can be used to promote digestion, and reduce gas, and bloating in foods such as rice and bean dishes. It is a cholagogue, which helps stimulate bile production in the liver while also facilitating bile evacuation through the gallbladder. Turmeric is recommended for people who suffer from persistent digestive issues and/or congestion (Debjit et al., 2009). The leaves are known as a great source of vitamins and minerals (Chattopadhyay et al., 2003).

Cooking and other postharvest processing operations of turmeric such as washing, cleaning, curing or blanching, drying, polishing, size reduction, and packaging may have detrimental effects on the quality of turmeric powders (Jose & Joy, 2009).

Over-cooking spoils the colour of the final product while under-cooking renders the dried product brittle (Kamble & Soni 2009). Drying has been recognized as the most useful processing technique for prolonging the durability and quality of food crops including spices (Dissa et al., 2011). The rhizome of turmeric when dried and ground can be used as a spice ingredient in food preparation for flavouring, colouring, and preservation of food (Jiang, 2019).

The biggest challenge in food processing is subsequent nutrient loss. Actual losses depend on various factors such as food type, temperature, and cooking time. Nearly all food preparation and preservation methods lead to losses. However, the quality of turmeric powder is also determined by the processing methods employed which might lead to nutrient loss and contamination due to poor handling during processing (Emelike et al., 2017). Processing of foods in these wet and humid environments brings special difficulties for the management of the product. Processing the foods to ensure a stable stored product is of particular importance in wet and humid environments this creates the need for efficient and effective drying methods (UNIDO & FAO, 2005).

In Africa and Nigeria in particular, the problems of many rhizomes (ginger, turmeric), and bulbs (garlic, onion), especially the indigenous ones, results in wastage during the in-season and limited supply during the off-season. This leads to high prices for these commodities because of their

seasonality and not being available all year round (Omayio et al., 2020). Appropriate preservative and postharvest methods should be performed to prolong the consumption of such nutrient-rich foods all year round (Chavasit et al., 2002). Hence there is a need for research studies to be explored extensively in curtailing these shortfalls.

Objectives of the study

The objectives of the study were to;

1. determine the proximate composition (ash, moisture, fat, crude protein, crude fibre, and carbohydrate) of raw, blanched, and cooked sundried and shade-dried turmeric samples;
2. determine the vitamin (vitamin C and beta-carotene) composition of the turmeric samples; and
3. determine the mineral (phosphorus, calcium, iron, and potassium) composition of the samples.

Materials and methods

Study design: The study was pure experimental design.

Procurement of raw materials: The stems of *Curcuma longa* (Turmeric), were purchased from a local market (Ogige) in the Nsukka Local Government area of Enugu State. The turmeric rhizomes were bought from five different sellers in the local market by random sampling to get a better representation of the sample.

Sample preparation: Undamaged fresh rhizomes of turmeric were selected. They were sorted to remove roots, sand, and other debris. The nodes

were detached from the parent rhizomes to enhance proper cleaning thereafter, they were washed thoroughly in clean water to remove soil particles on them and then divided into three samples. This sample was blanched for 10 minutes at 100° C. It was then strained, peeled, and thinly sliced. It was divided into two portions. The first portion was sun-dried, and the second portion shade dried until a constant weight was obtained. Sample A was blanched for 10 minutes by scalding the turmeric in boiling water at 100°c. It was cooled under running water, strained, peeled, and thinly sliced. It was divided into two portions. The first portion was sun-dried and the second portion shade shade-dried until a constant weight was obtained. Sample B sample was cooked for 30 minutes until the aroma became very strong. It was strained, peeled, and thinly sliced. It was divided into two portions. The first portion was sun-dried, and the second portion shade dried until a constant weight was obtained. Sample C sample was peeled and thinly sliced without any form of heat treatment. It was divided into two. The first portion was sun-dried, and the other portion shade dried until a constant weight was obtained. All samples were labelled appropriately for chemical analysis.

Proximate composition: The proximate composition of the turmeric samples was determined using standard methods: The moisture content of the sample was determined using the hot air oven method (AOAC, 2010). Ash determination was carried

out using the standard procedure of the Association of Official Analytical Chemists (AOAC, 2010). The micro Kjeldahl method described by AOAC (2010) was used for crude protein determination. Crude fibre was determined using the method described by AOAC (2010). The AOAC (2010) method was used for crude fat determination. The total carbohydrate was obtained by difference:

100%- (% Moisture + % crude protein + % crude fat + % crude fibre + %Ash)

Vitamin analysis: The AOAC (2010) method was used to determine the Vitamin C (ascorbic acid) content of the samples. The quantity of B-carotene in the samples was determined using the Harbone method as described by Jakutowicz et al. (1997).

Mineral Analysis: Calcium was determined using the dry ashing method described by AOAC (2010). The AOAC (2010) method was used to determine the iron content of the sample. Magnesium content was determined by atomic absorption spectrophotometer as described in the official method of the Association of Official Analytical Chemists (AOAC, 2010). The method of flame photometry described by AOAC (2005) was used to determine the potassium content of the samples.

Statistical Analysis: Data obtained were statistically analysed using Statistical Package for Service Solution (SPSS) version 21. Values were reported as mean and standard deviation (SD) and the means were analysed using analysis of variance

(ANOVA). Duncan's new multiple range test (DMRT) was used to separate the means of the samples at a 5% probability level ($p < 0.05$).

Results

Proximate Composition of the Samples

Table 1.1 shows the proximate composition of the different samples. The carbohydrate content of the samples ranged from 53.01-61.37%. The cooked sundried sample (CSD) had the highest (61.37%) carbohydrate value while the raw shade dried sample had the lowest value (53.01%). The protein content ranged from 4.17 - 9.74%. The raw shade-dried sample had the highest protein value (9.74%) while the cooked sun-dried sample had the lowest value (4.17%). Ash content oscillated between 7.07-8.03%. The cooked shade-dried sample had the highest ash value (8.03%) while the raw sun-dried sample had the lowest value (7.07%). The fat content ranged from 5.81 to 7.80%. The raw shade dried sample had the highest fat value (7.80%) while the cooked sundried sample had the lowest value 5.81%. The moisture content ranged from 14.48-18.50%. The cooked shade dried sample had the highest moisture value (18.50%) while the raw sundried sample had the lowest value (14.48%). The crude fibre content of the samples varied; the values ranged from 3.99-6.78%. The raw sun-dried samples had the highest fibre value (6.78%) while the cooked shade-dried samples had the least value (3.99%).

Table 1: Proximate composition of the samples

Parameter	Carbohydrate (%)	Protein (%)	Ash (%)	Fat (%)	Moisture (%)	Fibre (%)
BSD	57.55±0.11	7.06±0.04	7.90±0.04	6.39±0.01	15.93±0.01	5.18±0.02
BShD	55.93±0.06	7.51±0.06	7.21±0.03	7.00±0.01	17.57±0.01	4.80±0.01
CSD	61.37±0.08	4.17±0.01	7.25±0.04	5.81±0.03	17.03±0.05	4.38±0.01
CShD	58.33±0.05	4.97±0.04	8.03±0.04	6.19±0.01	18.50±0.04	3.99±0.01
RSD	55.51±0.50	8.61±0.04	7.07±0.04	7.21±0.03	14.48±0.00	6.78±0.02
RShD	53.01±0.11	9.74±0.07	7.48±0.10	7.80±0.01	15.41±0.03	6.57±0.03

Values = Mean ± SD of sample in duplicates. Key: **BSD** – Blanched sundried, **BShD** – Blanched shade dried, **CSD** – Cooked sun-dried, **CShD** – Cooked shade dried, **RSD** – Raw sundried, **RShD** – Raw shade dried.

Mineral Composition of the Samples

Table 4.2 shows the mineral composition of the samples. The phosphorus content of the samples oscillated between 0.12-0.37%. Raw shade dried sample had the highest phosphorus content (0.37%) while cooked sundried sample had the lowest value (0.12%). The potassium content ranged from 11.66 to 46.66mg/100g. Cooked sun-dried sample had the highest potassium content (46.66 mg/100g) while raw shade dried sample had the lowest

value (11.66mg/100g). The iron content of the samples increased from 3.95-9.75mg/100g. Boiled sundried sample had the highest iron content of (9.79mg/100g) while the cooked sundried sample had the list value (3.95mg/100g). The calcium content of the samples varied from 595.74±55.89mg/100g. The boiled sun-dried sample had the highest value (595.74mg/100g) while the raw sun-dried sample had the lowest value (55.41mg/100g).

Table 2: Mineral composition of the samples

Parameter	Phosphorus (%)	Potassium (mg/100g)	Iron (mg/100g)	Calcium (mg/100g)
BSD	0.20±0.00	40.82±3.54	9.79±2.65	595.7±5.89
BShD	0.32±0.00	37.07±5.30	5.83±0.59	65.19±2.06
CSD	0.12±0.00	46.66±4.12	3.95±1.47	107.6±0.98
CShD	0.21±0.01	37.07±5.30	9.16±2.63	65.19±2.06
RSD	0.27±0.01	31.04±6.19	6.46±0.88	55.41±4.12
RShD	0.37±0.01	11.66±1.77	7.29±0.29	73.53±2.06

Values = Mean ± SD of sample in duplicates. Key: **BSD** – Blanched sundried, **BShD** – Blanched shade dried, **CSD** – Cooked sun-dried, **CShD** – Cooked shade dried, **RSD** – Raw sundried, **RShD** – Raw shade dried.

The Vitamin Composition of the Samples

Table 3 shows the vitamin composition of the different samples. The Beta-carotene value ranged from 12.70-20.10µg/100g. Raw shade dried sample had the highest value (20.10µg/100g) while the cooked sun-

dried sample had the lowest value (12.70µg/100g. Vitamin C increased from 1.30 - 3.60mg/100g. Raw shade dried samples had the highest value of Vitamin C (3.60mg/100g) while cooked sun dried sample had the lowest value (1.30mg/100g).

Table 3: Vitamin composition of the samples

Parameter	B-carotene (µg/100g)	Vitamin C (Mg/100g)
BSD	16.10±0.14	2.10±0.14
BShD	17.65±0.21	2.80±0.00
CSD	12.70±0.14	1.30±0.14
CShD	13.10±0.14	1.70±0.14
RSD	18.55±0.07	3.10±0.14
RShD	20.10±0.14	3.60±0.00

Values = Mean ± SD of sample in duplicates. Key: **BSD** - Blanched sundried, **BShD** - Blanched shade dried, **CSD** - Cooked sundried, **CShD** - Cooked shade dried, **RSD** - Raw sundried, **RShD** - Raw shade dried.

Discussion

Proximate Composition of the Sample

The effects of sun drying and shade-drying processing methods on the nutrient composition of raw, cooked, and blanched turmeric (*Curcuma longa*) were investigated. The cooked shade dried sample had the highest moisture content (18.50%) when compared to other processed samples. This increase in moisture content is not in line with the findings of Ikpeama et al. (2014), who found low moisture content of steamed turmeric at 8.92% and 11.80% respectively. The low moisture of cooked shade-dried sample is desirable and indicative of a longer shelf life and will slow down the growth of microorganisms.

The protein content of the raw shade-dried sample was higher when

compared to other samples. This is similar to the findings of Ikpeama et al. (2014) who reported 9.40% of steamed turmeric. Cooked sun-dried and cooked shade-dried samples had the lowest protein concentration; this could be a result of protein solubilization and nitrogenous material leaking out during the cooking process. Incorporating this sample into one's diet can provide a considerable amount of protein, which has several advantages, including the development and repair of biological tissues, the maintenance of fluid balance, and hormone synthesis (Nwamarah et al., 2015).

Ash content determines the presence of minerals in any food material (Sarke et al., 2021). Cooked shade-dried sample had the highest

ash value (8.03%). This differed from the 2.86% ash content of shade-dried sample reported by Harbor (2020). This could be a result of duration of the cooking process. The 8.03% ash content shows that the cooked shade dried sample would contain an appreciable amount of minerals.

The fat content of the sample ranged from 5.81 -7.80%. This is within the range of 7.11% reported by Abara et al. (2021). The sun-dried sample was found to have the lowest fat content which implies that when turmeric is cooked and sundried, the fat content is depleted, reducing the shelf life. Denaturation of lipids and breakdown into glycerol and fatty acid by heat could also have been the reason for the observed lower value for fat.

The raw sun-dried sample had the highest value for crude fibre compared to the processed samples. Ahaotu and Lawal (2019) similarly reported a decrease in the crude fibre content of dried turmeric. This indicates that some amount of crude fibre is lost during the processing of turmeric. Fibre helps to cleanse the digestive tract by removing potential carcinogens from the body and prevents extra cholesterol from being absorbed (Ikpeama et al., 2014)

The carbohydrate values in this work are similar to the studies reported by Ahaotu and Lawal, (2019) and Harbor, (2020) whose values were 64.58% and 67.50% respectively. This shows that turmeric is a good source of carbohydrates. Carbohydrate contributes to the proper functioning

of your brain, kidneys, heart muscles, and central nervous system.

Mineral Composition of the Samples

The high quantities of calcium, potassium, and iron in the sample demonstrated that turmeric is a rich source of these minerals. The levels of calcium 0.21mg/100g, potassium 0.46mg/100g, and iron 0.045mg/100g reported by Ikpeama et al. (2014) were lower when compared to the values in this work. Calcium and potassium reduce the risk of cardiovascular and other ailments if consumed regularly. Phosphorus, when combined with calcium, aids in the development of strong, healthy bones as well as the overall wellness of your body. Iron performs many important functions in the body. It is primarily involved in the transfer of oxygen from the lungs to tissues. However, iron also plays a role in metabolism as a component of some proteins and enzymes (Haschka et al., 2021).

Vitamin Composition of the Sample

Raw shade-dried sample has a significant amount (20.10µg/100g) of beta-carotene and this is the highest among the other values reported in this study. Beta-carotene is a precursor of Vitamin A, which is essential for eye health and eyesight, as well as healthy skin, growth and development, and immune system function (Newman, 2017).

Cooked sun-dried and cooked shade-dried samples had lower vitamin C levels than the other samples, however, the shade-dried sample had higher vitamin C

(3.60mg/100g) than the sundried samples. This is because vitamin C is a water-soluble, temperature-sensitive vitamin, and cooking and drying induce more loss (Harbor, 2020). Victor et al. (2020) reported a higher value for vitamin C (19.47mg/100g) compared to the values recorded in this study. This could be a result of differing methodologies for determining vitamin C composition.

Conclusion

The nutrient value of the different samples increased with the drying methods. The increase or decrease of nutrients may be attributed to the removal of water molecules by drying. The findings of this study showed that among these diverse processing methods, raw shade dried tumeric samples were more nutritious in terms of nutrient conservation than other processing methods. The nutrients were all more positively affected by shade-drying method compared to sun drying method.

Recommendations

1. The processing of raw turmeric should be highly encouraged as it conserves more nutrient
2. The use of shade drying method processing method is recommended as it has been found to retain more nutrients.

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Perceived Effect of Post-pandemic Experiences on Student's Academic Stress and Mental Health: A Case Study of Social Science Education Students of the University of Nigeria, Nsukka

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Abstract

The study investigated the perceived effect of post-pandemic experiences on students' academic stress and mental health: A case study of Social Science Education students of the University of Nigeria, Nsukka. The study adopted a descriptive design. The sample size consists of 165 (26 male and 139 female) students. The study was guided by four research questions and two null hypotheses. Data were collected using a structured questionnaire. The instrument was validated by three experts from the Departments of Social Science Education and Science Education of the University of Nigeria. The Cronbach alpha coefficient was 0.76. Data were analyzed using mean, while the null hypotheses were tested with a t-test at $p \leq 0.05$. The result showed that the students experienced class extension beyond school hours ($\bar{x}=3.60$), missed lectures ($\bar{x}=3.54$), inadequate time to study materials ($\bar{x}=3.52$), and frequent and congested lectures ($\bar{x}=3.50$), among others. On the perceived effect on mental health, the study found that students experienced tense feelings severally during class presentations due to lack of time to prepare ($\bar{x}=3.27$), frequent panic after the pandemic due to academic work overload ($\bar{x}=3.22$), feelings of disinterest in academic activities ($\bar{x}=3.21$), among others. Results from the hypotheses show that significant gender difference was found in the perceived effect of post-pandemic experiences on students' academic stress but not on their mental health. The study recommended among other things that students should employ effective and positive strategies in managing their activities to reduce the occurrence of academic stress and mental health challenges.

Keywords: Pandemic, Experiences, Academic Stress, Mental Health

Introduction

A pandemic is a disease outbreak that spreads across countries or continents. It affects more people and takes more lives than an epidemic. A pandemic usually occurs on a scale that crosses international boundaries, affecting people on a worldwide scale (WHO, 2020). Globally, mankind has experienced many significant health emergencies in recent history. One of such global health emergencies is the Corona Virus Disease 2019 (COVID-19). The outbreak of the COVID-19 pandemic posed a great threat to the whole of humanity all over the world (Roy, & Kaur, 2020).

The pandemic brought about significant disruptions to education in the affected countries of the world. Emerging evidence from some of the countries indicates that the pandemic gave rise to learning losses and an increase in inequality. The pandemic has had a peculiar dissipating impact on education in Nigeria and other countries through decreased levels of education, broadened existing divide in learning access and outcomes, and increased school dropouts (Dorn et al., 2020). The threat posed to education is compounded due to peculiar vulnerabilities, including poor health systems, poverty and inequality, hunger, internally displaced populations, high population densities, urban-rural divide, and out-of-school population (Obiako & Adeniran, 2020). Pandemics have created a serious threat to short- and long-term physical and mental health as well as the social wellbeing of all groups in society. Vulnerable groups, including

university students, were especially affected by the COVID-19 pandemic (Fruehwirth et al., 2021) resulting in some experiences subsequently. These experiences are what the researchers conceptualized as post-pandemic experiences.

Post-pandemic experiences refer to the changes in human lives that have occurred as a result of the COVID-19 pandemic. These experiences can include changes in the way individuals work, socialize, learn, and interact with others. As a result of the pandemic, many universities have shifted to online classes, virtual labs, and remote assignments, which can lead to a different learning experience compared to in-person classes. University students have had to become more adept at using technology for learning, communication, and socialization. Many university students have faced financial challenges as a result of the pandemic, such as job loss, reduced income, and increased expenses for housing and technology. They may have also experienced a sense of isolation and disconnection from their peers, faculty, and campus life as a result of social distancing measures and reduced on-campus activities.

Studies conducted among college and university students in various parts of the world, including the UK, found evidence of increasing levels of anxiety, depression, distress and other mental health conditions among this population (college and university students) during and after the pandemic (Fruehwirth et al., 2021; Ma

et al., 2020). Hence, while Nigeria is battling with underlying educational challenges that have kept the country behind in getting young people ready for the dynamic workplace (Dan-Nwafor et al., 2020; Obiako & Adeniran, 2020; Yinka & Adebayo, 2020), COVID-19 impacts further exacerbate this problem as students now experience higher academic stress levels (Habeeb et al., 2023).

Academic stress is a serious challenge among many students. Academic stress according to Reddy et al. (2018) is the pressure that comes from large amount of workload, too much material to be studied and insufficient study time to show their best academic performance. Post pandemics experiences have resulted in significant increases in stress, anxiety, depression, and suicidality among students of higher institutions (Husky et al., 2020; Patsali et al., 2020). Aside from dealing with stressors related to a potentially unfamiliar online learning environment, students are also coping with the emotional impact of COVID-19 which affected their mental health (Clalaugh et al., 2021).

The COVID-19 pandemic significantly impacted the educational sector, leading to a global shift to remote learning. As students returned to in-person learning, they faced various challenges and experiences; some common post-pandemic experiences reported by students include social readjustment difficulties as students struggled to reconnect with peers and teachers after prolonged

isolation. Also, the transition back to in-person learning exposed gaps in understanding and learning losses. Students dealt with anxiety, depression, and trauma related to the pandemic. Students also developed a new appreciation for in-person learning and social interactions (Okagbue et al., 2023). Some students became more tech-savvy, expected hybrid learning options, and learned to adapt to changing circumstances, and developed coping strategies. These students adjusted to various teachers' efforts to support them post-pandemic. Some other students struggled to balance schoolwork, extracurricular activities, and social life, which came with adverse effects on the students' mental health (Bruffaerts et al., 2018).

Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community. It is an integral component of health and well-being that underpins individual and collective abilities to make decisions, build relationships and shape the world (World Health Organization [WHO], 2022). Mental health according to United Nations (2016) is a positive concept related to the social and emotional wellbeing of people and communities (Manwell et al., 2015). Factors responsible for poor and good mental health of students are not limited to academic stress, health emergencies like Covid-19 outbreak which most often result to depression among university students. These

often condition students to the risk of suicide, substance abuse, low self-esteem and poor performance in academics (Ismail & Shujaat, 2018). The competitive environment nature of education that is characterized with huge demanding and time challenging routine often leaves many students to high levels of stress and when students appraise their education as a challenge, they tend to see it more as threat that must be conquered or battled with which has adverse effects on their mental health (Yu et al., 2015). This may differ with respect to gender. Gender refers to the characteristics of women, men, girls and boys that are socially constructed. Both genders are challenged with having to keep up with the high demands required to thrive in the university environment due to academic stress (National Library of Medicine, 2021). To meet these demands, students (both genders) must be able to work and function under pressure. In addition, female students reported stress-related issues, such as low self-esteem, pressure from exams, and depression (Thawabien&Qaisy, 2012). Higher levels of general and academic stress were also shown to be greater in female students than their male counterparts (Rahardjo et al., 2013).

Men and women also experience different kinds of mental health problems. Mental health differences between women and men have been attributed to sex and gender differences (Otten et al., 2021). While women exceed men in internalizing disorders such as depression and

anxiety, men exhibit more externalizing disorders such as substance abuse and anti-social behaviour, which are problematic for others (Rosenfield & Mouzon, 2013).

Post Covid-19 experiences exposed many students to mental health challenges. Some common mental health problems among college students have been stress, relationship difficulties, low self-confidence, loneliness and homesickness anxiety, eating problems, depression and suicidal ideation (Li et al., 2021). However, this study determined the post covid-19 experience of undergraduate students with a focus on Social Science Education students and how they influence the student's academic stress and mental health while profiling strategies to ameliorate the effect of the identified challenges.

This study examined the perceived effect of post pandemic experience on students' academic stress and mental health: a case study of Social Science education students in University of Nigeria, Nsukka. Specifically, this study answered the following research questions:

1. What are the post pandemic experiences of Social Science education students in University of Nigeria, Nsukka?
2. What are the perceived effects of post pandemic experiences on academic stress of social science education students in University of Nigeria, Nsukka?
3. What are the perceived effects of post pandemic experiences on mental health of Social Science

education students in University of Nigeria, Nsukka?

4. What are the strategies for ameliorating the effects of post pandemic experiences on Social Science education students' academic stress and mental health?

The following hypotheses were tested at 0.05 level of significance

H₀₁: There is no significant difference in mean response of male and female students on perceived effects of post pandemic experiences on academic stress of Social Science education students in University of Nigeria, Nsukka

H₀₂: There is no significant difference in mean response of male and female students on the perceived effects of post pandemic experiences on students' mental health

Methodology

Study Design: The study adopted a descriptive survey research design. Descriptive survey research design aims at collecting data and describing in a sequential and systematic manner the characteristics of a specific population.

Study Population: The population of the study consisted of 655 Social Science education students of UNN in the 2022/2023 academic session in University of Nigeria, Nsukka (Social Science Education UNN Departmental Data, 2023).

Sample and Sampling Technique: The sample for this study was 165 200 level and 300 level students from the

Department of Social Science Education which is the total population. This was made up of 26 male students and 139 female students. The choice of 200 and 300 level students is based on the fact that they experienced the pandemic and will provide experiential responses to the survey. 400 level students were excluded due to the fact that they are caught up with trying to finish up their projects and thus may not be able to have time to respond to the survey.

Instrument for Data Collection: The instrument used in collecting data for the present study was a questionnaire. The questionnaire was constructed by the researchers in line with the research objectives. The questionnaire was divided into two; sections A and B. Section A obtained the personal data of the respondents while section B comprised 4 clusters (A-D) structured to elicit information from the respondents based on the research questions. Cluster A obtained information on post-pandemic experiences of Social Science education students. Cluster B obtained information on the perceived effects of post-pandemic experiences on Social Science education students' academic stress; Cluster C obtained information on the perceived effects of post-pandemic experiences on Social Science education students' mental health. Cluster D obtained information on strategies for ameliorating the effects of post-pandemic experiences on Social Science education students' academic stress and mental health. The items were arranged on a four-point

scale of strongly agree (4), agree (3), disagree (2) and strongly disagree (1).

Validation and Reliability of the Instrument: The instrument for this study was validated by three experts in the Faculty of Education. Two were from Social Science Education (Economics Education) and one from Science Education (Measurement and Evaluation). The validated instrument was trial tested on 20 students that were selected from Art Education Departments in the University of Nigeria which was different from the Department covered by the study. The reliability coefficient of 0.76 was determined using the Cronbach Alpha reliability coefficient showing acceptable internal consistency of the test items.

Data Collection Procedure: The researchers visited and sought permission from the HOD of the Department of Social Science Education University of Nigeria, Nsukka before the commencement of the study. The researchers with the help of two assistants (each from the Social Studies and Political Science units respectively) administered 165 copies of the questionnaire to the students of Social Science Education students in print form. The process of responding to the questionnaires was explained to the students to ensure that valid data were collected. The researchers collected the questionnaire as soon as the respondents filled in their responses which ensured one

hundred percent of the questionnaire collection.

Data Analysis: The data collected were analyzed using mean and standard deviation. The responses/items with a mean score of 2.50 and above were accepted while responses/items below 2.50 were rejected. The null hypothesis was tested using a t-test at a 0.05 level of significance. The null hypothesis was not rejected when the calculated p-value was less than 0.05 alpha level. The mean values on the hypothesis's tables were ascertained by calculating the cluster mean for the research questions (Cluster B and C) under investigation separately for both males and females.

Results

Post-pandemic experiences of students

The post-pandemic experiences of students include: clashing of lectures (3.65), congestion of lessons (3.63), lack of leisure (3.56), excessive study materials (3.49), excessive course contents (3.48), assignment overload (3.44), academic calendar without break (3.34), class extension beyond school hours (3.33), reduced social life (3.24), inability to comprehend lecture content (3.13), unfriendly online alternated lectures (3.10), reduced lecturer-student relationship (3.03), frequent lectures (3.01) and boring lectures (2.84)

Table 1: Mean rating of the post-pandemic experiences of the respondents

Item Statement	Mean	SD	Decision
Clashing of Lectures	3.65	.54	Agree
Congestion of lessons	3.63	.48	Agree
Lack of leisure	3.56	.52	Agree
Excessive study materials	3.49	.59	Agree
Excessive course contents	3.48	.66	Agree
Assignment overload	3.44	.68	Agree
Academic calendar without break	3.34	.83	Agree
Class extension beyond school hours	3.33	.70	Agree
Reduced social life	3.24	.80	Agree
Inability to comprehend lecture content	3.13	.69	Agree
Unfriendly online alternated lectures	3.10	.74	Agree
Reduced Lecturers-students' relationship	3.03	.82	Agree
Frequent Lectures	3.01	.74	Agree
Boring Lectures	2.84	.77	Agree

Perceived effects of post pandemic experiences on academic stress of Social Science Education Students

Results on table two below show that class extension beyond school hours led to academic overload (3.60), missing lectures due to class clashes resulted in inability to cover/compete course/lecture contents (3.54), inadequate time to study materials brought about increase in failure rate as result of too much unlearned

material (3.52), frequent and congested lectures resulted in academic burnout (3.50), frequent lectures resulted in inadequate time to attend extra curricula activities (3.43), assignment overload reduced my leisure time (3.43), assignment overload reduced my ability to study effectively (3.32) and unfriendly online alternated lectures manifested in inability to comprehend lecture content (3.14).

Table 2: Perceived effects of post pandemic experiences on academic stress of Social Science Education Students

Item Statement	Mean	SD	Decision
Class extension beyond school hours led to academic overload	3.60	.56	Agree
Missing lectures due to class clashes resulted in inability to cover/compete course/lecture contents	3.54	.72	Agree

Inadequate time to study materials brought about increase in failure rate as result of too much unlearned material	3.52	.60	Agree
Frequent and congested lectures resulted in academic burnout	3.50	.65	Agree
Frequent lectures resulted in inadequate time to attend extra curricula activities	3.43	.68	Agree
Assignment overload reduced my leisure time	3.43	.64	Agree
Assignment overload reduced my ability to study effectively	3.32	.78	Agree
Unfriendly online alternated lectures manifested in inability to comprehend lecture content	3.18	.73	Agree

Perceived effects of post pandemic experiences on mental health of Social Science education students in University of Nigeria, Nsukka

Analysis on table 3 below showed that students: experienced tensed feeling severally during class presentation due to lack time to prepare (3.27), frequently panicked after the pandemic due to academic work overload (3.22), experience feeling of disinterest in academic activities as a result of post pandemic class extension

beyond school hours (3.21), had feelings of nervousness as a result of inability to finish assignment (3.11), had feeling of hopelessness as a result of inability to balance academic and social life (3.04), was unable to manage some post pandemic experience made me feel depressed (3.03), experienced frequent dizziness as a result of post pandemic boring lectures (2.97) among others.

Table 3: mean rating of the perceived effects of post pandemic experiences on mental health of social science education students in University of Nigeria, Nsukka.

Item Statement	Mean	SD	Decision
I experienced tensed feeling severally during class presentation due to lack time to prepare	3.27	.71	Agree
I frequently panicked after the pandemic due to academic work overload	3.22	.77	Agree
I experience feeling of disinterest in academic activities as a result of post pandemic class extension beyond school hours	3.21	.74	Agree
I had feelings of nervousness as a result of inability to finish assignment	3.11	.78	Agree
I felt hopeless as a result of inability to balance academic and social life	3.04	.80	Agree
Inability to manage some post pandemic experience made me feel depressed	3.03	.83	Agree
I experience frequent dizziness as a result of post pandemic boring lectures	2.97	.75	Agree

Strategies for ameliorating the effects of post pandemic experiences on Social Science education students' academic stress and mental health

Analysis on table 4 below showed that academic counseling (3.34), reduction the academic workloads (3.33), encouraging students to visit health clinic (3.22), improving social support among friends and family (3.20), use of online materials (3.15), attending to

academic activities one at a time to avoid mental health challenges (2.98), deliberately avoid classes to reduce stress level (2.67), avoiding assignments (2.57) and fixing classes on weekend to cover contents (2.56) are strategies for ameliorating the effects of post pandemic experiences on Social Science education students academic stress and mental health

Table 4: Strategies for ameliorating the effects of post pandemic experiences

Item Statement	Mean	SD	Decision
Academic counseling of the student on the management of mental health brought about by the pandemic	3.34	.68	Agree
Schools should reduce the academic workloads of the students in order to reduce the menace of mental health	3.33	.68	Agree
Encouraging students to visit health clinic when experiencing signs of mental stress	3.22	.73	Agree
Improving social support among friends and family	3.20	.85	Agree
Use of online materials to support learning contents for easy comprehension	3.15	.83	Agree
Attending to academic activities one at a time to avoid mental health challenges	2.98	.87	Agree
Deliberately avoid classes to reduce stress level	2.67	1.05	Agree
Avoiding assignments	2.57	1.03	Agree
Fixing classes on weekend to cover contents	2.56	1.08	Agree

Gender difference on the perceived effect of post pandemic experiences on academic stress and mental health of the respondents

Table 5 shows the summary of t-test on the gender difference on the perceived effect of post pandemic experiences on students' academic stress. The data contained in the table above show that the value of t-test -2.39 is significant at 0.018. Since the p-value (0.018) is less than 0.05 level of significance then the null hypothesis is rejected. The mean

difference on the perceived effect of post pandemic experiences on students' mental health was not significant; $t = 0.367$, $p = 0.714$. Since the p value (0.714) is greater than 0.05 level of significance, the null hypothesis is not rejected which stated that there is no significant difference in mean response of male and female students on the perceived effects of post pandemic experiences on students' mental health.

Table 5: Gender difference on the perceived effect of post pandemic experiences on academic stress and mental health of the respondents

Gender	N	Mean	T	df	Sig. (2-tailed)
Academic stress					
Male	26	3.23	-2.392	163	0.018
Female	139	3.48			
Mental health					
Male	26	3.08	-0.367	163	0.714
Female	139	3.13			

Discussion of Findings

This study identified various post-pandemic academic experiences of the university students with a focus on Science Education students. These post pandemic experiences include boring lectures, too frequent lectures, academic calendar without breaks, class extension beyond school hours, unfriendly online alternated lectures, reduced social life, clashing of lectures, congestion of lessons, lack of leisure, excessive study materials, excessive course contents, and reduced lecturers-students' relationship. The findings of the study agree with Ebohon et al. (2021) finding which stated that the outbreak of COVID-19 led to changes in normal academic activities which led to new experiences in the universities in the post-COVID-19 era.

This study also revealed that class extension beyond school hours led to academic overload, missing lectures due to class clashes resulted in the inability to cover/complete course/lecture content, and inadequate time to study materials

brought about an increase in failure rate as a result of too much unlearned material, frequent and congested lectures resulted in academic burnout, frequent lectures resulted in inadequate time to attend extra curricula activities, assignment overload reduced my leisure time, assignment overload reduced my ability to study effectively and unfriendly online alternated lectures manifested in inability to comprehend lecture content. The findings suggest that extended class hours may lead to academic overload, causing stress and decreased productivity. Class clashes might result in missed lectures, making it difficult for students to keep up with course material. Inadequate study time could also lead to increased failure rates due to unlearned material. Findings also highlight that frequent and congested lectures cause academic burnout, leading to mental exhaustion and decreased motivation. Also, excessive lectures leave little time for extracurricular activities, limiting students' opportunities for personal

growth and development. Moreover, assignment overload reduces leisure time, leading to an unhealthy academic work-life balance. Excessive assignments also hinder effective studying, as students may feel overwhelmed and unable to fully engage with course material. Furthermore, unfriendly online learning environments can lead to difficulty comprehending lecture content, highlighting the importance of user-friendly and engaging online platforms. This finding is in agreement with Robledillo et al. (2022) which found that academic stress after the outbreak of COVID-19 and the increased academic stress was attributed to academic over-burden. The finding also aligns with Dey and Kumar (2022) which found that students experienced academic stress after the outbreak of COVID-19. The increase in students' academic stress in post post-pandemic era can be attributed to congested academic activities because of less time to cover academic materials.

The finding of this study showed that the perceived effect of post-pandemic experiences on academic stress of Social Science Education students varied by gender. The mean values of the male and female students showed that females had higher mean values than males implying that female students had higher levels of academic stress caused by post-COVID-19 experiences than their male counterparts. This gender disparity is a crucial insight, as it highlights the need to consider the unique challenges and

perspectives of male and female students in the academic environment. Several factors might contribute to this disparity: social and emotional responsibilities, learning style and environment as well as career and future concerns. This is in line with Rahardjo et al. (2013) which found that academic stress was also shown to be greater in female students than their male counterparts. The finding also agrees with Lai et al. (2022) which found that females experienced higher academic stress than male students.

This study further found that students: experienced tense feelings severally during class presentations due to lack of time to prepare, frequently panicked after the pandemic due to academic work overload, experienced feelings of disinterest in academic activities as a result of post-pandemic class extension beyond school hours, had feelings of nervousness as a result of inability to finish assignment, had feeling of hopelessness as a result of inability to balance academic and social life, was unable to manage some post-pandemic experience made me feel depressed, experienced frequent dizziness as a result of post-pandemic boring lectures. As a response to the COVID-19 outbreak and the lockdown measures, many schools suspended in-person classes and evacuated students from their campuses. The reopening of the schools came with increased academic stress which occasioned strong negative emotions among university students with high levels of psychological challenges that they

faced which adversely affected the students' mental health status. This finding is in line with the findings of Baumann et al. (2021), Gogoi et al. (2022), and Olawade et al. (2021) findings which showed that covid-19 affected students' mental health. This negative effect of COVID-19 experiences on students' mental health was because of academic stress, anxiety, and the associated depression. This underlines the relationship between academic stress and the mental health of the students as increased academic stress and mental health challenges were all found among the students. Therefore, a reduction in academic stress experienced by the students could also lead to negative mental health conditions associated with post-pandemic experiences. The finding of this study also showed that though the females had higher mean scores, there was no significant difference in the mean response of male and female students on the effects of post-pandemic experiences on their mental health. This means that post-pandemic experiences had similar effects on both male and female students' mental health. Rosenfield and Mouzon (2013) found that females reported higher mental health problems than their male counterparts. The present study shows that male and female students of Social Science Education being in the same class, attending the same lecture, and being exposed to the same learning contents among others could be the reason for no significant difference found by this study on the

effects of post covid-19 experiences on their mental health. However, the findings did not corroborate with the findings of Otten et al. (2021) who reported that there is a difference in the mental health status of female and male students.

The findings of this study showed that academic counseling, reduction the academic workloads, encouraging students to visit health clinics, improving social support among friends and family, use of online materials, attending to academic activities one at a time to avoid mental health challenges, deliberately avoid classes to reduce stress level, avoiding assignments and fixing classes on weekend to cover contents are strategies for ameliorating the effects of post-pandemic experiences on Social Science education students academic stress and mental health.

Conclusion

This study concludes that students had post-pandemic experiences and these post-pandemic experiences affected their academic stress and mental health. Hurried academic activities often led to missed lectures, inadequate study time, burnout, and reduced leisure time resulting in academic stress. Consequently, the students experienced stress, panic, disinterest, nervousness, hopelessness, and depression, which affected their mental health. However, various strategies were identified to ameliorate the negative effects of the stress associated with post-pandemic academic activities. These include switching to online classes and

reducing the academic workload of the students were identified for ameliorating the effects of post-pandemic experiences on students' academic stress and mental health.

Recommendations

The following recommendations were made by the researchers based on the study's findings:

1. Students should employ effective and positive strategies in managing their activities (academic, religious, social and political) to reduce the occurrence of academic stress and mental health challenges.
2. The school management should involve the student bodies in the planning of the academic calendar and not only during implementation. This will help in resolving the issue of congested lectures among others
3. There is need for parents and school managements to increase students' access to guidance and counselling services to help in reducing the negative implications of academic stress and mental health challenges associated to post pandemic experiences.

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Qualitative and Quantitative Analysis of Microbes in Locally Fermented Food Condiments Sold in a Selected Market in Enugu State

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Abstract

The microbiological assessment of three commonly consumed Nigerian fermented food condiments, ogiri (*Ricinus communis*), ukpaka (*Pentaclethra macrophylla*), and okpei (*Parkia biglobosa*), sourced from different vendors in Nkwo-Ibagwa market, Nsukka, was conducted to ascertain their quality. The objectives of the study were to identify microbial contaminants and their total viable count, compare the total viable count of microorganisms, isolate and identify the Gram's characteristics of the microorganisms in the samples using established protocols. Descriptive statistics (mean and standard deviation) and ANOVA were used to analyze the data. The findings revealed the presence of fermentative bacteria such as *Bacillus coagulance*, *Bacillus subtilis*, *Micrococcus varians*, *Bacillus licheniformis*, *Lactobacillus fermenti*, *Lactobacillus caesi*, and *Micrococcus luteus*. Pathogenic bacteria including *Pseudomonas aeruginosa*, *Escherichia coli*, *Staphylococcus saprophyticus*, *Staphylococcus aureus*, and *Klbsiellaoxytoca* were also detected. Notably, ogiri and ukpaka samples had both gram-positive and gram-negative microorganisms, whereas only gram-positive microorganisms were found in okpei samples. The total bacterial counts ranged from 1.5×10^6 cfu/g to 1.2×10^9 cfu/g, with ogiri exhibiting the highest total coliform count and okpei the lowest. There was a significantly different mean total viable count of microbes in okpei (4.1×10^6 cfu/g) compared to ogiri (6.6×10^8 cfu/g) and ukpaka (3.8×10^8 cfu/g). The study highlights the potential health risks, including poisoning and gastroenteritis, faced by consumers of these condiments. Consequently, it advocates for enhanced hygiene practices among processors and traders to mitigate cross-contamination and ensure consumer safety.

Keywords: Fermentation, Fermented foods, Condiments, Fermented food condiments, Microbiological quality

Introduction

Fermentation is viewed as one of the oldest and most cost-effective techniques for producing and

preserving foods in developing countries (Chukwu et al., 2019). It is defined as the extensive growth of microorganisms on a suitable medium,

often with the aim of generating specific chemical products such as enzymes, vaccines, antibiotics, or various food products or additives (Ramesh & Joshi, 2014). This process takes place without the presence of oxygen, and is facilitated by microorganisms like yeast and bacteria. Fermented foods are defined as delectable products, derived from both raw or heat-treated materials, and whose distinct properties are acquired through microbial processes (Ogunshe & Olasubga, 2008). These foods hold considerable significance as they not only provide, but also preserve substantial quantities of nutritious food items, presenting a diverse array of flavours, aromas and textures that contribute to the enrichment of the human diet (Osho et al., 2010). Nigeria, specifically, boasts of a wide variety of indigenous staple foods suitable for fermentation, many of which serve as essential condiments in household food preparations.

Condiments refer to edible substances which are added to foods to impart a specific flavor, enhance existing flavors, and in certain cultural contexts, complement the dish (Chukwu et al., 2019). They can be derived from both plant and animal sources, utilizing processes in which microorganisms actively participate in altering the physical, nutritional and sensory properties of the initial ingredients. Typically, local condiments are prepared through traditional methods involving uncontrolled solid substrate fermentation leading to extensive

breakdown of proteins and carbohydrates. These local condiments, often produced from fermented vegetable protein, are typically presented as oily pastes with distinctive ammonical scent (Isu&Ofuya, 2000). In Nigeria, these local condiments are integral to food preparation, serving as flavour enhancers to impart pleasant aroma to soups, sauces and other traditional dishes. Additionally, these local condiments serve as rich sources of protein, essential amino acids, lipids, carbohydrates, fatty acids and vitamins (Olasupo, 2006). Among the most widely recognized indigenous fermented condiments available in local markets in Nsukka are ogiri, ukpaka and okpei.

Ogiri is a local condiment derived from melon or castor seed oil (*Ricinus communis*) belonging to the family of Euphorbiaceae. It undergoes a fermentation process where bacteria and fungi breakdown the proteins and carbohydrates in the seeds. This process yields a paste-like substance characterized by a strong aroma and nutty flavour, typically wrapped in plantain or banana leaves (Achi, 2005). In Nigerian cuisine, Ogiri is widely utilized to impart flavor and fragrance to soups and various dishes, particularly in the eastern and southern regions, where it features prominently in recipes such as ofeakwu (Banga soup), ofeonuogbu (bitter leaf soup), and ofeoha (oha soup). The production techniques for Ogiri are deeply rooted in Nigerian tradition, with methods varying across

regions and specific ingredient choices. Besides its flavor-enhancing properties, ogiri boasts significant nutritional value, being a rich source of protein, fiber, essential amino acids, vitamins, and minerals. Recent years have witnessed a surge in interest regarding Ogiri, with some studies (Irobi et al., 2000; Ibeabuchi et al., 2014; Ahaotu et al., 2020; Okwunodulu et al., 2020) suggesting its potential as a functional food offering health benefits such as antimicrobial and antioxidant properties.

Ukpaka, a ready-to-eat condiment, is produced by fermenting African oil bean seeds (*Pentaclethra macrophylla*), a specie of the Fabaceae family. Predominantly consumed by the Igbo people of southeastern Nigeria, it serves as a protein rich delicacy typically produced in households as a small-scale family enterprise, leading to variations in production methods and resulting in non-uniform products (Ogueke et al., 2010). Ukpaka is commonly enjoyed with various local dishes such as tapioca (Abacha), different yam, cocoyam, and pigeon pea dishes. It serves as an affordable protein source, particularly for those whose staple diets are deficient in protein (Obeta, 2008) and is reported to be rich in fats and carbohydrates (Odoemelam & Nwokedi, 2005). During the fermentation process of ukpaka, bacteria such as *Bacillus subtilis*, *B. micrococcus* and *B. lactobacillus* significantly alter the product nutritionally, biochemically and organoleptically and are often introduced through air, water, utensils

or handlers themselves (Ogueke & Aririata, 2004).

Okpei is another locally fermented food condiment derived from locust bean seed (*Parkia biglobosa*) and is known by various indigenous names such as iru (Yoruba), okpehe (Idoma) and kiriya (Hausa) (Ogunshe et al., 2007). It is commonly utilized across Nigeria by Igbo, Yoruba, and Middle Belt indigenous populations to enhance the flavor of soups and various local dishes (Gberikon et al., 2015). It is a good source of protein, thus offers a cost-effective option for individuals with limited income and can help address protein-energy malnutrition and essential fatty acid deficiencies (Oguntoyinbo et al., 2001). Okpei is used in the preparation of a wide range of dishes including soups like ofeoyi, egusi, ogbono and okro soups; sauces such as local tomato sauce, vegetable sauce; and local dishes such as yam, potato, plantain pottage and local jollof rice. Similar to ogiri and ukpaka, the primary organisms involved in okpei fermentation predominantly the *Bacillus* species, including *B. subtilis*, *B. pumilus*, *B. licheniformis* and *B. megaterium* (Oguntoyibo et al., 2010; Geberikon et al., 2015). Although these three fermented condiments have not been implicated in food poisoning, the absence of standardized sanitary and quality control measures during household production in Nsukka Local Government Area raises concern, prompting the need for microbial quality assessments.

Microbial quality of food refers to the absence or limited presence of harmful microorganisms, such as pathogens and spoilage organisms, in a food product (Springer, 2005). It constitutes a crucial aspect of food safety, ensuring that the food is safe for consumption and has an extended shelf life. Microbial quality is commonly evaluated through microbiological analysis, employing techniques to detect and quantify microorganisms within a food sample. Investigating the microbial quality of locally fermented foods is essential to ensure that the food products are of a high quality, and are safe for consumption. The selection of Nkwo-Ibagwa market for this study stems from its significance as a central trading hub for these condiments, which are integral in the traditional cuisine of the region.

Objectives of the study: The broad objective of the study was to determine the microbiological quality of three locally fermented food condiments sold in Nkwo-Ibagwa market in Nsukka, Enugu State. Specifically, the study sought to:

1. identify the microbial contaminants and their total viable count in samples of ogiri, ukpaka and okpei sold in Nkwo-Ibagwa market in Nsukka, Enugu State;
2. compare the total viable count (microbial load) of microorganisms in the samples of ogiri, ukpaka and okpei and;

3. isolate and identify gram characteristics of microorganisms in the different samples.

Materials and Methods

Sample procurement: The samples were procured from Nkwo-Ibagwa market located in Enugu State, Nigeria. It is situated in the Ibagwa-Ani community, which is part of the Nsukka Local Government Area of Enugu State. A total of 15 packaged samples, 5 samples each of okpei, ukpaka and ogiri were randomly purchased from different sellers in the market. They were labelled accordingly and transported immediately in an ice chest to the laboratory for analysis.

Sample cultivation: The samples were transferred onto oven-dried, sterile agar plates and streaked using a sterile inoculating wire loop. After a 10-minute standing period, the plates were incubated at specific temperatures (35°C for 48 hours on glucose-enriched agar plates and 25°C for 72 hours on sabourauds dextrose agar plates). Observations were made after the initial 48-hour and 72-hour incubation periods, followed by additional incubation for another 48 hours for further assessment.

Determination of the original cell population (Total Viable Count: TVC) of the microbes: The surface viable count method was used to determine the original cell population. 1g of the samples were weighed and suspended in 10ml of sterile water, then allowed to stand for 15 minutes with agitation at intervals. Serial dilutions were prepared using the 10-fold serial

dilution techniques as described by American Public Health Association [APHA] (1985). The oven dried sterile glucose enriched agar plate was divided into 8 equal parts, and labeled and a portion of each dilution was plated onto it. The plates were incubated at 35°C for 48 hours, and colonies were counted to determine the dilution yielding countable colonies. Mean colony counts per drop were calculated from the observed growth on the plates.

Identification of bacteria isolates: Each colony was then isolated and transferred onto oven-dried sterile agar plates using a sterile inoculating wire loop. The plates were then incubated overnight at 35°C. Following the incubation period, the culture plates were examined for purity of the isolates. The bacteria isolates were identified based on colonial morphology like color of hyphae, shape and texture. The method of Foyowo (2017) was used for the microscopic examination of the bacteria isolates using the wet mount technique. The observed characteristics were compared with the characteristics of reference organisms according to Cooper (1995).

Statistical analysis: Data generated from the study was coded into Statistical Product for Service Solution (SPSS version 23). Descriptive statistics (mean and standard deviation) was used to analyze the data. The level of significance was determined using one way analysis of variance (ANOVA) and accepted at $p \leq 0.05$. Duncan's New Multiple Range test was used to separate means for each parameter.

Results

Presence of and total viable count (microbial load) of microorganisms in the samples

Table 1 shows the presence of microbiological contaminants as well as the microbial load of each sample. The result shows that all the 15 samples had growth of various microorganisms on 0.5% W/V Glucose enriched agar. Furthermore, the total viable count of ogiri samples ranges from 1.2×10^9 cfu/g to 9.5×10^8 cfu/g. The microbial load of ukpaka samples ranges from 2.0×10^8 cfu/g to 6.5×10^8 cfu/g. The total viable count of microorganisms in the okpei samples ranges from 1.5×10^6 cfu/g to 8.0×10^6 cfu/g.

Table 1: Presence of and total viable count (microbial load) of microorganisms in the samples

Sample	Growth on 0.5% W/V Glucose Enriched Agar	Total viable count (cfu/g)
Ogiri 1	Positive	400000000 \cong 4.0×10^8
Ogiri 2	Positive	950000000 \cong 9.5×10^8
Ogiri 3	Positive	550000000 \cong 5.5×10^8
Ogiri 4	Positive	1200000000 \cong 1.2×10^9
Ogiri 5	Positive	200000000 \cong 2.0×10^8
Ukpaka 1	Positive	250000000 \cong 2.5×10^8
Ukpaka 2	Positive	350000000 \cong 3.5×10^8
Ukpaka 3	Positive	650000000 \cong 6.5×10^8
Ukpaka 4	Positive	450000000 \cong 4.5×10^8
Ukpaka 5	Positive	200000000 \cong 2.0×10^8
Okpei 1	Positive	4000000 \cong 4.0×10^6

Okpei 2	Positive	1500000 \approx 1.5x10 ⁶
Okpei 3	Positive	8000000 \approx 8.0x10 ⁶
Okpei 4	Positive	4500000 \approx 4.5x10 ⁶
Okpei 5	Positive	2500000 \approx 2.5x10 ⁶

Comparison of the total viable count (microbial load) of the condiments

Table 2 shows the significant difference between the microbial loads of ogiri, okpei and ukpaka samples. From the table, okpei (4.1x10⁶cfu/g) differed significantly (p = 0.006) from ogiri and ukpaka. However, the mean tvc of microbes in ogiri (6.6x10⁸cfu/g) and ukpaka (3.8x10⁸cfu/g) were comparable (p = 0.11).

Table 2: Comparison of the total viable count (microbial load) of the different condiments

Samples	Mean TVC (cfu/g)
Ogiri	660000000 ^b ± 408350339.80
Ukpaka	380000000 ^b ± 178885438.20
Okpei	4100000 ^a ± 2484954.72

Values = mean ± standard deviation. Means with the same superscripts are comparable at p ≤ 0.05 while means with different superscript are significantly different at p ≤ 0.05.

Gram characteristics of microorganisms in samples of the food condiments

Table 3 shows the gram character of the microorganisms present in the samples. Both gram positive and gram-negative microorganisms were present in the ogiri samples when gram stained. A similar pattern was also observed in the ukpaka samples. In the okpei samples, all microorganisms were gram positive when gram stained. The table also presents the microorganisms identified in each of the samples. From the table, *Bacillus coagulance*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Micrococcus varians*, *Bacillus licheniformis*, *Lactobacillus fermenti* and *Lactobacillus casei* were isolated and identified in different samples of ogiri. The microorganisms identified in samples of ukpaka include *Escherichia coli*, *Micrococcus luteus*, *Lactobacillus fermenti*, *Micrococcus varians*, *Staphylococcus saprophyticus*, *Klebsiella oxytoca*, *Bacillus subtilis* and *Lactobacillus casei*. Similarly, *Bacillus subtilis*, *Lactobacillus fermenti*, *Staphylococcus aureus* and *Micrococcus varians* were isolated and identified in different samples of okpei.

Table 3: Gram characteristics of microorganisms in samples of the food condiments

Sample	Gram's character	Isolate identified
Ogiri 1	Positive, negative	<i>Bacillus coagulance</i> , <i>Bacillus subtilis</i> , <i>Pseudomonas aeruginosa</i> , <i>Micrococcus varians</i> , <i>Bacillus licheniformis</i>
Ogiri 2	Positive and negative	<i>Bacillus subtilis</i> , <i>Pseudomonas aeruginosa</i> , <i>Micrococcus varians</i> , <i>Lactobacillus fermenti</i>

Ogiri 3	Negative and positive	<i>Bacillus subtilis, Pseudomonas aeruginosa, Micrococcus varians, Lactobacillus casei, Lactobacillus fermenti,</i>
Ogiri 4	Positive	<i>Bacillus subtilis, Pseudomonas aeruginosa, Micrococcus varians, Lactobacillus fermenti</i>
Ogiri 5	Positive and negative	<i>Bacillus subtilis, Pseudomonas aeruginosa, Micrococcus varians, Lactobacillus fermenti</i>
Ukpaka 1	Positive and negative	<i>Escherichia coli, Micrococcus luteus, Lactobacillus fermenti</i>
Ukpaka 2	Positive and negative	<i>Escherichia coli, Micrococcus varians, Lactobacillus fermenti, Staphylococcus saprophyticus, Klebsiella oxytoca</i>
Ukpaka 3	Negative and positive	<i>Micrococcus varians, Lactobacillus fermenti, Klebsiella oxytoca</i>
Ukpaka 4	Positive and negative	<i>Escherichia coli, Micrococcus varians, Lactobacillus fermenti, Staphylococcus saprophyticus, Klebsiella oxytoca</i>
Ukpaka 5	Positive and negative	<i>Bacillus subtilis, Micrococcus varians, Lactobacillus casei, Staphylococcus saprophyticus, Klebsiella oxytoca</i>
Okpei 1	Positive	<i>Bacillus subtilis, Lactobacillus fermenti, Staphylococcus aureus,</i>
Okpei 2	Positive	<i>Micrococcus varians, Lactobacillus fermenti, Staphylococcus aureus</i>
Okpei 3	Positive	<i>Bacillus subtilis, Lactobacillus fermenti, Staphylococcus aureus</i>
Okpei 4	Positive	<i>Bacillus subtilis, Micrococcus varians, Staphylococcus aureus</i>
Okpei 5	Positive	<i>Micrococcus varians, Lactobacillus fermenti, Staphylococcus aureus</i>

Discussion of findings

The findings of this study revealed the presence of microorganisms in each sample of ogiri, ukpaka and okpei sold in Nkwo-Ibagwa market in Nsukka. This outcome is anticipated, given that these condiments undergo fermentation, a process reliant on the presence of microorganisms. The present study revealed varying levels of microbial presence in samples of ogiri, ukpaka and okpei. The lowest total viable count of microorganisms was observed in ogiri4 while ogiri2 had the highest. Sample Ukpaka3 and Ukpaka5 exhibited the highest and lowest total viable counts respectively within the Ukpaka samples. Sample Okpei2 and Okpei3 had the lowest and

highest total viable counts in okpei samples.

The microbial load of a food product reflects the quantity of microorganisms present within that product, typically measured as colony-forming units per gram (cfu/g). It is an important hygiene indicator that may give information about the overall microbiological status of food products. These microorganisms may have contaminated the condiments at any stage, ranging from production up to the point of sale. Comparatively, the total microbiota counts observed in these condiments exceeded those reported by Fowoyo (2017), whose study recorded microbial counts ranging from 9.5×10^5 to 1.8×10^6 cfu/g.

It is noteworthy that microbial counts serve as an indicator solely for the microbiological quality of a food product and there are no universally binding standards governing the quality of products of this type. Thus, following the criteria outlined by Lepcka et al. (2022), the food condiments analyzed in this study were categorized as unsatisfactory due to their total viable count of organisms exceeding 10^6 cfu/g.

The microbial load in okpei sample was significantly lower compared to ogiri and ukpaka. This suggests that okpei might be less prone to spoilage and may have a longer shelf-life. The result is expected given that okpei has lower moisture content than the others as it is usually sundried after production. A lower microbial load indicates a lower risk of contamination by harmful bacteria, which can reduce the risk foodborne illness. Thus, consumers of okpei may face fewer health risks related to microbial contamination. The microbial loads of ogiri and ukpaka are comparable, indicating similar levels of microbial activity in the products. These two condiments are usually wrapped in leaves or stored in plastic bags after production. Thus, the higher microbial load indicates improper handling or/and storage which can pose potential health risk to the consumer.

Gram positive bacteria are characterized by thick cell walls which provide them with protection against antibiotics and other potentially harmful substances. On the other hand, gram negative bacteria have

thinner cell walls and are more susceptible to antibiotic destruction. This study identified microorganisms exhibiting either gram-positive or gram-negative characteristics. This simply implies that the gram-positive microorganisms may present challenges in antibiotic treatment in cases of infection due to their resistance or reduced susceptibility, whereas gram-negative microorganisms are typically more susceptible to antibiotics. Thus, consumption of food contaminated with any of these microorganisms can result in varying degrees of difficulty in treatment. This finding is in line with the observations of Ogunshe&Olasugba (2008) who noted that gram-negative bacteria isolated in their study have been implicated in acute bacterial diarrheas and food poisoning incidents.

The microorganisms identified in this study included *Bacillus coagulance*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Micrococcus varians*, *Micrococcus luteus*, *Bacillus licheniformis*, *Lactobacillus fermenti*, *Lactobacillus casei*, *E.coli*, *Staphylococcus aureus*, *Staphylococcus saprophyticus* and *Klebsiella oxytoca*. This finding is in line with that of Fowoyo (2017). According to Enujiugha (2009), *Bacillus* species are commonly associated with the fermentation process of locust bean seeds used in the production of okpei. *Bacillus* species produce protease enzymes, which play a key role in the breakdown of proteins, contributing to the texture and flavor of fermented foods (Fowoyo, 2017). It is worthy to note that *Bacillus subtilis* is recognized

a Generally Regarded as Safe (GRAS) organism by the Food and Drug Administration, and is commonly found in the human gut, with humans likely to exhibit resistance to its effects.

While the bacillus strains identified in this study were deemed safe for human consumption, they may pose potential side effects to the consumer. Enujiugha (2009) reported that *B. coagulance* can lead to stomach upset, bloating or gas, while *B. licheniformis* may cause vomiting, diarrhea and abdominal cramps when consumed in high numbers (10^6 – 10^8). These symptoms typically manifest within 2 to 14 hours after consumption and may persist for up to 24 hours. *B. licheniformis* produces heat-resistant toxins called lichenysin, which remain unaffected by cooking or the host's digestive system. In line with the study, Dodd et al. (2017) noted that diseases associated with *B. subtilis* exhibit rapid onset, occurring within ten minutes to fourteen hours, with symptoms resolving within 1.5 to 8 hours. Common symptoms include vomiting, diarrhea accompanied by abdominal cramps, nausea and headaches. Additionally, *B. subtilis* produces an enzyme called subtilisin, which when consumed in high quantities, may trigger allergic reactions.

Pseudomonas aeruginosa, a gram-negative bacterium commonly found in water, soil, plant and animal tissues, is recognized as an opportunist human pathogen which possesses the ability to cause severe acute and chronic life-threatening infections such as

meningitis, otitis media, urinary tract infections and pneumonia. In this study, *Pseudomonas aeruginosa* was isolated in ogiri samples, a condiment often wrapped in layers of leaves prior to sale. Hence, contamination of this condiment may have occurred through the leaves used for wrapping, water utilized during sample preparation or via contact with surfaces, equipment or the handler themselves. This finding is consistent with the observations of Gao et al. (2023), who similarly identified *Pseudomonas aeruginosa* as a common food spoilage bacterium, noting its ability to proliferate even at low temperatures and its frequent involvement in foodborne infections. Consequently, the practice of refrigerating ogiri contaminated with this bacterium in an attempt to inhibit its growth may prove ineffective. Moreover, *Pseudomonas aeruginosa* has been isolated from various food items in prior studies conducted by Xu et al. (2019), Li et al. (2020), Erhirhie et al. (2020), and Ezemba et al. (2022). Recent research has also highlighted the antibiotic resistance of *Pseudomonas aeruginosa* strains, particularly against Ceftazidime, Cefepime and Tobramycin (Xie et al., 2017; Liu et al., 2018). This emphasizes the importance of monitoring and addressing microbial contamination in food products to mitigate health risks posed by antibiotic-resistant pathogens like *Pseudomonas aeruginosa*.

Micrococcus varians and *Micrococcus luteus*, both gram-positive cocci bacteria commonly utilized in food fermentation, are generally recognized as GRAS and are renowned for

enhancing the colour and flavour profiles of fermented food products. The findings of this study indicate the widespread presence of *Micrococcus varians* across nearly all examined samples, with *Micrococcus luteus* detected in a single sample of ukpaka. This finding aligns with reports by Fowoyo (2017). Despite their GRAS status, both *M. varians* and *M. luteus* are implicated as food spoilers, diminishing the shelf-life of food products. Additionally, *M. luteus* has been associated with opportunistic pathogenicity, contributing to various health ailments including septic arthritis, prosthetic valve endocarditis, and recurrent bacteraemia, pneumonia in acute leukaemia patients, and catheter-related infections in pulmonary arterial hypertension patients. Nuñez (2014) emphasizes the importance of recognizing *M. luteus* not solely as a contaminant but also potential pathogen necessitating therapeutic interventions.

Lactobacillus species such as *Lactobacillus fermenti* and *Lactobacillus casei* are gram-positive bacteria identified in this study which demonstrated varying prevalence among the samples evaluated, with *Lactobacillus fermenti* detected in 12 out of 15 samples and *Lactobacillus casei* in 2 out of 15 samples. This aligns with the findings reported by Ogunshe and Olasugba (2008). *Lactobacillus fermenti*, as the name implies, plays a pivotal role in the fermentation of food products while *Lactobacillus casei* contributes to both fermentation and ripening processes. Despite being generally regarded as safe, these

bacteria may induce gastrointestinal discomfort, including gas, stomach upset or diarrhea when consumed above 10^9 colony-forming units. Additionally, individuals with allergies may experience adverse reactions such as skin rash, hives, swelling, dizziness and difficult breathing upon ingestion.

Staphylococcus species, gram-positive bacteria belonging to the Staphylococcaceae family were also identified in this study, comprising *Staphylococcus saprophyticus* and *Staphylococcus aureus*. *Staphylococcus saprophyticus* was identified in three samples of ukpaka while *Staphylococcus aureus* was present in four samples of okpei. These bacteria are commonly spread because of poor hygiene and sanitary practices. Notable, *S. aureus* is usually found in the nasal cavity of humans and contaminates food substances when infected droplets are dispersed through sneezing or coughing. According to Bush and Schmidt (2023), *Staphylococcus aureus* portrays a significant concern among staphylococcal bacteria, posing a considerable risk of food poisoning that is often resistant to treatment with certain antibiotics. The Center for Disease Control and Prevention (2023) has pointed out the ability of *Staphylococcus aureus* to proliferate in foods and reproduce heat-resistant toxins, rendering them capable of causing illness even after cooking. While the bacterium itself can be destroyed by heat, the toxins are not and still possess the ability to cause illness after heating. Symptoms of food

poisoning from this bacterium manifest within 30 minutes of consuming food and subside within 24 hours. It is worth to note that antibiotic treatment is ineffective against illnesses caused by *staphylococcus aureus* because the toxins produced are not susceptible to antibiotic action.

The results of the study have also identified *Klebsiella oxytoca* and *Escherichia coli* in four and three samples of ukpaka, respectively. The detection of these potential pathogens emphasizes the associated risks linked with consuming this condiment and underscores the necessity of stringent control measures. Ukpaka is commonly consumed without heat treatment rendering it susceptible to microbial contamination. *Klebsiella oxytoca* is a gram-negative bacterium that occurs in the nasal cavity of humans and animals and can contaminate food products through contact with contaminated surfaces, equipment, and poor hygienic practices. Consumption of foods contaminated by *Klebsiella oxytoca* may result in foodborne illnesses including nausea, abdominal cramps and vomiting, dehydration, and fatigue. *Escherichia coli*, also a gram-negative bacterium originating from fecal matter, was likewise detected in ukpaka samples. The presence of *E. coli* in this food condiment is an indication of poor hygiene conditions and inadequate sanitary practices among the handlers. While most strains of *E. coli* are harmless, certain strains can cause severe food poisoning.

According to the World Health Organization [WHO] (2018), symptoms of *E. coli* infection may include diarrhea (potentially bloody diarrhea in severe cases), fever and vomiting, lasting from three days to eight days, with most patients fully recovered by the tenth day. However, such infections may be life threatening to children and the elderly. The absence of *Klebsiella oxytoca* and *Escherichia coli* in samples of Okpei and Ogiri is noteworthy and commendable suggesting better hygiene practices or inherent differences in processing methods compared to ukpaka.

Conclusion

The study qualitatively and quantitatively analyzed microbes in locally fermented food condiments sold in a selected market in Enugu state. All fifteen samples showed microbial growth on 0.5% W/V glucose-enriched agar, and the microbial counts exceeded acceptable limits, indicating unsatisfactory microbiological quality according to established criteria. The microbial load in okpei sample was significantly lower than those of ogiri and ukpaka, indicating a lower risk of contamination by harmful bacteria. Ogiri samples contained both gram-positive and gram-negative microorganisms, including *Bacillus coagulans*, and *Pseudomonas aeruginosa*. Ukpaka samples also contained both gram-positive and gram-negative microorganisms, such as *Escherichia coli* and *Lactobacillus fermenti*. Okpei samples had only gram-positive microorganisms, including *Bacillus*

subtilis and *Staphylococcus aureus*. Gram-positive bacteria have thick cell walls that protect them from antibiotics and other harmful substances while gram-negative bacteria have thinner cell walls, making them more vulnerable to antibiotics. The presence of pathogenic bacteria such as *Staphylococcus aureus* and *Escherichia coli* in some samples highlights the need for improved hygiene practices and sanitary measures throughout the food production chain. The potential health risks associated with these pathogens, including severe foodborne illnesses, highlight the importance of stringent quality control measures to safeguard consumer health.

Recommendations

The following recommendations were made based on the findings of this study:

1. Producers and sellers of okpei, ogiri, and ukpaka should be encouraged to implement strict hygienic practices during the production, packaging, and storage of these condiments. This includes proper hand washing, sanitizing equipment and storage containers, and maintaining a clean and controlled environment.
2. Regular testing and monitoring of samples for microbial contamination to help identify potential issues and take corrective measures. This will help in ensuring their safety and quality.
3. Collaboration among researchers, producers, farmers, and vendors should be encouraged to improve

the overall quality and safety standards of locally fermented food condiments. This collaboration will ensure that stakeholders can collectively work towards implementing best practices and innovative solutions to address food safety concerns.

4. Local health authorities and public health agencies in Nsukka, Enugu State should play a crucial role in ensuring food safety within the community. They should enforce adherence to regulations, conduct regular random inspections, and provide training programmes aimed at enhancing hygiene practices of condiment producers and vendors. This will immensely contribute to the prevention of foodborne illnesses and the promotion of public health.

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Influence of Social Media Use on the Eating Behavior and Food Preferences of Undergraduate Students in the University of Nigeria, Nsukka

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Abstract

This research evaluated the influence of social media use on the eating behaviors and food preferences of undergraduate students in the University of Nigeria. Four objectives and two hypotheses guided the study. A descriptive and correlational research designs was adopted for the study for a population of 39,295 students. Multi-stage sampling technique was used to select a sample of 368 students. Data was collected using structured questionnaires validated by three experts. Data was analyzed using frequencies, percentages, mean, standard deviation, and chi-square. The result revealed that the majority (73.1%) of the respondents make occasional use of social media applications with WhatsApp (96.2%), YouTube (84.8%), Gmail (83.7%), Facebook (78.5%) and Instagram (72.8%) being used by many of the students. The less common applications were Skype (10.6%), Tumblr (14.1%), and Reddit (14.7%) among others. The respondents' eating behaviours showed that more than a third (35.1%) of them were emotional under eaters and those with hungry eating behaviour were 26.6%. A greater proportion (26.6%) of the students preferred snacks, 26.1% preferred dairy, 25.8% preferred fruits and very few (3.0%) preferred vegetables. Findings further showed that the frequency of social media use was not significantly associated with the eating behaviours and food preferences of the students. The study recommended that the University authority should provide nutrition education that will foster a healthier campus environment.

Keywords: Social media, Eating behaviour, Undergraduate students, Food preferences

Introduction

According to Reid and Weigle (2014), the impact of social media among

adolescents and young people can be a powerful change agent. With technological convergence (accessing

several technologies from one device), many young adults can access social media on their mobile phones and prefer to always have access to their social networks (Vaterlaus et al., 2015). Social media is a collective term for websites and applications that promote communication, community-based input, content-sharing, and collaboration. It is an effective tool that can be used to influence, inform, and persuade as well as stay in touch with friends and family (Nesi et al., 2018). Social media mobile applications have global reach, use, and engagement. In an earlier global report, approximately 85% of adolescents and young adults reported using a social media website (Reid & Weigle, 2014). Various forms of social media in existence include blogs, micro-blogs, wikis, social networking sites, photo-sharing sites, instant messaging, video-sharing sites, podcasts, widgets, virtual worlds, and more. These platforms allow users to have conversations, share information, and create web content. Social media outlets are no longer just an avenue to connect with friends but are increasingly a mechanism for consumers to get information about diverse phenomena such as politics, education, health, and nutrition among other things. For instance, a study by Masoud et al. (2019), determined that 94.2% of university students used at least one social media network, and more than half of these students spent about 1–4 hours a day on social media. These extended times spent on social media could easily lead users to develop specific changes in behaviour

(Durmaz et al., 2023), notably their eating behaviour.

Eating behaviours are defined as conscious, collective, and repetitive habits, which lead people to select, consume, and use certain foods or diets, in response to influences which could be social media influence and cultural influences (Medina et al., 2020). Eating behavior is a broad term that encompasses food choice and motives, feeding practices, dieting, and eating-related problems such as obesity, eating disorders, and feeding disorders. It is complex in the sense that human beings make hundreds of food decisions each day that are influenced by a variety of personal, social, cultural, environmental, and economic factors (LaCaille, 2013). Several environmental factors influence people's eating patterns. One of these is the usage of the internet and social media, which have become an integral part of daily life because of advances in information and communication technology (Durmaz et al., 2023).

Studies (Al Ali et al., 2021; Güneş & Demirer, 2023) have shown that social media use has a significant impact on eating behaviours among undergraduate students. According to study by Fardouly et al. (2015), social media use was associated with increased frequency of eating out, eating high-calorie foods, and skipping meals. The study found that students who spent more time on social media were more likely to eat fast food, consume sugary drinks, and eat fewer fruits and vegetables. Social media use

was also associated with disordered eating behaviours, such as binge eating, purging, and fasting (Fardouly et al., 2015). Furthermore, a review by Kucharczuk et al. (2022), concluded that food and beverage companies use celebrities and influencers on social media for marketing their products thereby contributing to the food preferences of individuals especially adolescents and young adults.

Food preference, also known as food choice, refers to how people decide on what to buy and eat. A complex set of factors that vary from person to person and depend on culture, heritage, and upbringing all influence food preference (European Food Information Council [EUFIC], 2022). The food choice of undergraduate students, who are mainly adolescents and young adults, is greatly influenced by certain factors such as food cost, access to food, culture, religion, appetite, taste, and social media. This indicates that students are drawn to what they see on social media. Not only does the social media influence food choices, but it also advertises so much about fit and lean bodies which makes adolescents become in awe of looking slim and attractive. As a result, they indulge in dieting culture and start consuming a variety of diets and supplements without consulting an expert. This proves fatal in the long run, as it potentially leads to eating disorders, poor health, and poor performance (Kucharczuk et al., 2022). A study by Cardello et al. (2012) found that exposure to food images on social

media increased students' desire for unhealthy foods, such as pizza, burgers, and fries. Conversely, students who were exposed to healthy food images, such as fruits and vegetables, were more likely to choose healthy foods.

With the increase in technology and internet use among young adults and university students, social media usage is also becoming widespread. A study carried out by Durmaz et al. (2023) shows that, in the digitalized world and due to the influence of post COVID-19 pandemic, almost all training and activities are carried out online. The study determined that more than half of the students (52.6%) spent more than 2 hours a day on social media, 39.5% used social media to spend time and share, and 35.6% used it for staying up to date. On the other hand, 81.1% of the students were interested in nutrition news on social media, and 31.9% stated that they followed nutrition news for weight control and weight loss. Another study found that most students spent 1–4 hours/day on social media, mainly using social media to stay up to date (Talaue et al., 2018). The widespread use of social media among university students suggests that social media has a strong influence on young adults. This effect of social media on students can affect all areas of their lives as well as their eating behavior and food preferences. A study by Murray et al. (2016) concluded that spending more time on the internet increases the level of exposure to social media and can affect eating behavior. This study

determined that, as the effect of social media on eating behavior increased, unhealthy food choices increased (Murray et al., 2016). With the increase of time spent on social media, the level of influence of students from social media increases, and their exposure to news and posts about nutrition and food increases, thus increasing social media's effect on eating behavior. Hence, it is thought that the increased exposure of the students to these posts can affect their unhealthy eating behaviour (Durmaz et al., 2023).

The technological developments in the world, the increase in the use of the internet and the use of different social media tools have created awareness in the field of nutrition as well as in other fields, and have brought a different dimension. Through the Internet and social media, all developments and activities in the field of nutrition can be followed, thereby increasing access to information and awareness (Thurairatnam, 2021). On the other hand, people's desire to learn about new diets has increased; because of this demand, various food vendors have emerged online, displaying various types of products and imposing various nutritional values to them. Consequently, a significant number of people, in their attempt to enhance their diet intake, unwittingly fall victim to those vendors (EUFIC, 2022). The etiology of eating behaviour is multifactorial, and exposure to media messages is considered to be a contributor. Although traditional media, such as television and magazines, have been examined

extensively in relation to eating concerns, the influence of social media has received relatively less attention (Sidani et al., 2016). This study therefore aimed to investigate the influence of social media use on eating behavior and food preferences of undergraduate students in the University of Nigeria.

Objectives of the study

The broad objective of this study was to determine the influence of social media use on the eating behavior and food preferences of undergraduate students in the University of Nigeria. The specific objectives were to:

1. identify the social media applications commonly used by the respondents;
2. determine the frequency of social media use among the respondents;
3. identify the eating behaviours of the respondents;
4. identify food preferences of the respondents;
5. ascertain the relationship between social media use and eating behaviors of undergraduate students in the University of Nigeria; and
6. determine the relationship between social media use and food preferences of undergraduate students in the University of Nigeria.

Null hypotheses (H₀)

The following null hypotheses were tested at $p \leq 0.05$ level of significance.

H₀₁ -There is no significant relationship between social media use and eating behaviors of

undergraduate students in the University of Nigeria.

H₀₂ -There is no significant relationship between social media use and food preferences of undergraduate students in the University of Nigeria.

Methodology

Study design: The study adopted a correlational research design. This design is most suitable for this study because the study investigated relationships

between variables without the researcher controlling or manipulating any of them (Bhandari, 2023).

Study population: The study population consisted of 39,295 undergraduate students studying in Nsukka and Enugu campuses during the 2021/2022 session (University of Nigeria Admissions Department, 2021).

Sample size and sampling procedure: The WHO (2013) guideline for the calculation of sample size in a survey was used to determine the sample size of the population using the formula below.

$$n = \frac{z^2 \times p(1-p)}{e^2} \div \left[1 + \frac{z^2 \times p(1-p)}{e^2 N} \right]$$

Where;

n = sample size

z = level of confidence (1.96);

p = baseline levels of the indicators (0.5 or 50%);

e = margin of error (0.05 or 5%);

N = Population size.

This gave a total of 381 undergraduate students that served as samples for the study. The study adopted a multi-stage sampling technique in selecting the samples. The first stage involved the use of simple random sampling by balloting for the selection of 30% (three) of ten faculties in UNN, Nsukka Campus, and 30% (two) of seven faculties in UNN, Enugu Campus. In stage two, proportionate sampling was used to determine the number of students to be selected from each faculty. In the final stage, simple random sampling without replacement was used to select the sample size computed for each faculty. Only the students who were available during the data collection period and gave their consent participated in the study.

Instrument for data collection: The instrument for data collection was a structured questionnaire. The questionnaire was structured based on fulfilling the objectives of the study and it comprised of sections A-D. Section A was used to obtain information on the background information of the respondents. Section B was used to elicit information on the types and level of social media use among the respondents. Section C was an adaptation of the Adult Eating Behaviour Questionnaire (AEBQ) by Zickgraf and Rigby (2019). The AEBQ is a 35-item measure that assesses eight appetitive traits on a 1-5 Likert agree/disagree scale. The eight eating behaviours were Food responsiveness, Hunger, Enjoyment of eating,

Emotional overeating, Emotional undereating, Satiety responsiveness, Slow eating, and Food fussiness. Section D was used to obtain information on the food preferences of the respondents. The food preference questionnaire requires participants to rate their liking of 72 individual foods on a 6-point response scale, ranging from "not at all" to "a lot". The food preference ratings were then grouped into six internally reliable categories as follows vegetables, fruits, meat/fish, dairy, snacks, and starches.

Validation and reliability of the instrument: The structured questionnaire was validated by three experts from the Department of Home Science and Management. Their suggestions and observations were used to improve the questionnaire items. The reliability of the test instruments was obtained using the Cronbach Alpha reliability test. The reliability index of the instrument was 0.98 and was considered highly reliable (Goforth, 2015).

Data collection method: With the help of trained assistants, 381 copies of the questionnaires were administered to students by hand in their different lecture halls. Variables were explained to them and any questions they had were answered. Due to incomplete information, 13 questionnaires were discarded giving a 97% return rate and 368 as the new sample size.

Data and statistical analysis: The scores of each respondent on the items for each eating behaviour were summed up and the behaviour they scored highest in was taken as their eating behaviour. The responses on

social media use were summed up and scores ranged from 1-60. Scores of 1-12 reflected very low use of social media, 13-24 reflected rare use, 25-39 showed occasional use and 40-60 was regarded as very frequent use of social. For responses on the frequency of the use of social media applications, a percentage of 50 and above was regarded as 'commonly used' while below 50 percent was regarded as 'not commonly used'. The data collected was entered into the computer software package, Statistical Product for the Service Solution (SPSS) version 23.0. The result was presented as frequencies and percentages. Chi-square was used to define the relationship among categorical variables. $P < 0.05$ was accepted as the level of significance.

Results

Socio-economic/demographic characteristics of the respondents

The socio-demographic data of the respondents showed that 50.3% of them were males, while 49.7% were females. Majority (76.7%) were aged 19-20years, while a few (0.3%) were aged above 30years. More than half (59.2%) of them had ₦10,000-₦30,000 allowance while 0.8% had above ₦50,000 monthly allowance. A greater proportion (54.1%) of the respondents was students of Nsukka campus while 45.9% were of Enugu campus. Up to 41.0% were in other years, 36.4% were in their first year and 22.6% were in final year. Their area of residence showed that 56.0% resided in the hostels while 44.0% stayed off-campus. Majority (82.6%) of them were of the

Igbo ethnic group, while very few (2.7%) were of Hausas. Most (94.3%) of the respondents were Christians, while 2.7% were Muslims.

Types of social media used by the undergraduates

Table 1 presents the types of social media used by the students.

WhatsApp (96.2%), YouTube (84.8%), Gmail (83.7%), Facebook (78.5%) and Instagram (72.8%) were some of the social media applications used by most of the students. On the other hand, the less common social media apps were Skype (10.6%), Tumblr (14.1%), and Reddit (14.7%) among others.

Table 1: Types of social media commonly used by the students

Social media	Yes F (%)	No F (%)	Remark
WhatsApp	354 (96.2)	14 (3.8)	Commonly Used
YouTube	312 (84.8)	56 (15.2)	Commonly Used
Gmail	308 (83.7)	60 (16.3)	Commonly Used
Facebook	289 (78.5)	79 (21.5)	Commonly Used
Instagram	268 (72.8)	100 (27.2)	Commonly Used
Telegram	257 (69.8)	111 (30.2)	Commonly Used
TikTok	245 (66.6)	123 (33.4)	Commonly Used
Snapchat	208 (56.5)	160 (43.5)	Commonly Used
Twitter	204 (55.4)	164 (44.6)	Commonly Used
Messenger	183 (49.7)	185 (50.3)	Not commonly used
LinkedIn	136 (37.0)	232 (63.0)	Not commonly used
Pinterest	123 (33.4)	245 (66.6)	Not commonly used
Reddit	54 (14.7)	314 (85.3)	Not commonly used
Tumblr	52 (14.1)	316 (85.9)	Not commonly used
Skype	39 (10.6)	329 (89.4)	Not commonly used

Frequency of social media use among undergraduates

Table 2 presents the frequency of social media use among the undergraduates. The majority (73.1%) of them occasionally used social media applications, 22.6% rarely used them and a few (4.3%) used social media applications very frequently (4.3%).

Table 2: Frequency of social media use among undergraduates

Variable	f	%
Rare use of social media	83	22.6
Occasional use of	269	73.1

social media		
Very frequent use of social media	16	4.3
Total	368	100.0

Eating behaviours of undergraduates

Table 3 shows the types of eating behaviour among the students. A greater proportion of the students were emotional under eaters (35.1%), 26.6% of them were hungry eaters, 19.6% were food fussy, and 10.6% of them were emotional over eaters. Those who enjoy food were 3.0%, 2.4% were slow eaters, 1.6% were food responsive were and 1.1% of the

students were satiety responsive (1.1%).

Table 3: Eating behaviours of undergraduates

Eating behaviours	<i>f</i>	%
Enjoyment of food	11	3.0
Emotional over eating	39	10.6
Emotional under eating	129	35.1
Food fussiness	72	19.6
Food responsiveness	6	1.6
Slowness in eating	9	2.4
Hunger	98	26.6
Satiety responsiveness	4	1.1
Total	368	100.0

Food preferences of undergraduates

Table 4 shows the food preferences of undergraduates. A greater proportion (26.6%) of the students preferred snacks, 26.1% preferred dairy, 25.8% preferred fruits, 16.6% preferred meat/fish, 3.0% preferred vegetables and 1.9% preferred starches.

Table 4: Food preferences of undergraduates

Food groups	<i>f</i>	%
Meat/fish	61	16.6
Dairy	96	26.1
Starches	7	1.9
Snacks	98	26.6
Fruits	95	25.8
Vegetables	11	3.0

Relationship between frequency of social media use and eating behaviour

Table 5 shows the relationship between social media use and eating behaviour of students. There was no significant relationship between social media use and eating behaviour of undergraduates. However, compared to others, more respondents who were emotional over-eaters and hungry eaters used the social media very frequently. Hypothesis one is therefore not rejected.

Table 5: Relationship between social media use and eating behaviours of undergraduates

Variable	EF F (%)	EOE F (%)	EUE F (%)	FF F (%)	FR F (%)	SE F (%)	H F (%)	SR F (%)	Total F (%)
Rare use	2 (2.4)	4 (4.8)	32 (38.6)	16 (19.3)	2 (2.4)	2 (2.4)	23 (27.7)	2 (2.4)	83 (100.0)
Occasional use	9 (3.3)	30 (11.2)	92 (34.2)	56 (20.8)	4 (1.5)	7 (2.6)	69 (25.7)	2 (0.7)	269 (100.0)
Very frequent	0 (0.0)	5 (31.3)	5 (31.3)	0 (0.0)	0 (0.0)	0 (0.0)	6 (37.5)	0 (0.0)	16 (100.0)
$\chi^2 = 17.248, df = 14, p = 0.243$									

χ^2 = Chi-square value; p = Level of significance; df = degree of freedom; *Correlation is significant at $p < 0.05$; EF - enjoyment of food; EOE - emotional over eating; EUE - emotional under eating; FF - food fussiness; FR - food responsiveness; SE - slowness in eating; H - hunger; SR - satiety responsiveness

Relationship between social media use and Food Preferences of undergraduates

Table 6 presents the relationship between social media use and students' food preferences. There was

no significant relationship between social media use and food preferences of undergraduate students in the

University of Nigeria. Hypothesis 2 is, therefore, not rejected.

Table 6: Relationship between Social Media use and Food Preferences of Undergraduates

Variable	Meat/fish F (%)	Dairy F (%)	Starch F (%)	Snacks F (%)	Fruits F (%)	Vegetables F (%)	Total F (%)
Rare use	14 (16.9)	21 (25.3)	1 (1.2)	25 (30.1)	21 (25.3)	1 (1.2)	83 (100.0)
Occasional use	45 (16.7)	73 (27.1)	6 (2.2)	68 (25.3)	67 (24.9)	10 (3.7)	269 (100.0)
Very frequent	2 (12.5)	2 (12.5)	0 (0.0)	5 (31.3)	7 (43.8)	0 (0.0)	16 (100.0)

$\chi^2 = 6.723$, df = 10, p = 0.751

χ^2 = Chi-square value; p = Level of significance; df = degree of freedom; *Correlation is significant at p<0.05

Discussion

This study was carried out to ascertain the influence of social media use on the eating behavior and food preferences of undergraduate students in University of Nigeria. In modern society, social media is one of the most frequently used mediums to communicate with one another (Dollarhide, 2024). Various forms of social networking are frequently used among undergraduates. Emanating from the study are findings that the social media platforms used by majority of the undergraduate students included WhatsApp, YouTube, Facebook and Instagram, with WhatsApp being the most dominant among them all with the percentage value of 96.2%. Supporting the finding of this study, a study conducted by Ahmad et al. (2020) revealed that 93% of undergraduate students used WhatsApp for collaborative learning. This finding is also in line with that of Akintola (2016) who discovered that WhatsApp is the

favorite social media platform for undergraduates in Universities in Kwara State. Walker (2014) also reported that WhatsApp has become the social media tool of choice in Qatar and other Arab countries such as Lebanon and Sudan. According to Holliday (2014), messaging applications like WhatsApp and WeChat are the future of social media, because of their dynamic nature.

Social media can have both positive and negative effects on the eating behaviors of students when used in a moderate manner. The result of this study shows that more than two-thirds of students make moderate use of social media applications. This implies that majority of undergraduates in the study area spend 1-3hours daily on different social media applications. This finding is in line with the study by Talaue et al. (2018), which revealed that students spend, on average, 1 to 3 hours per day on social media. Similarly, study by Alshanqiti et al. (2023) indicated that

26.1% of students spend 3-4 hours on social media per day, indicating moderate usage.

Understanding the eating behaviors of undergraduate students is essential for promoting their overall health and well-being. It is of paramount importance in fostering not only their physical health but also their overall well-being and academic success (Tanton et al., 2015). This study revealed that a greater proportion of the respondents were emotional under eaters, followed by those with hungry eating behaviour. This finding suggests that more of the students eat less in response to stress or negative emotions followed by those that eat when they are starved or have appetite for food. These implications show that there are significant challenges related to emotional well-being and nutrition among this student population. This study aligns with the research conducted by Ahmed et al. (2023), which showed that a greater number of the participants exhibited poor emotional eating behavior. However, these results contradict the findings of Ashurst et al. (2018) which revealed that participants who experienced strong emotions, particularly sadness, tended to consume significantly more food.

Recognizing the ever-changing and varied culinary preferences of adolescents and young adults is crucial for addressing their nutritional requirements and cultivating a health-conscious campus atmosphere (Liu et al., 2022). Findings of this study showed that a greater proportion of

the respondents preferred snacks, followed by those that preferred dairy products with vegetables being the least preferred. This implies that undergraduate students prefer food items such as biscuits, cookies, cake, ice cream, chocolate bars, buns, sweets and yoghurts but do not prefer vegetables like mushroom, broccoli and beetroot. This might be attributed to the unavailability of these vegetables in the study area. These results are similar to the findings of Tok et al. (2018) which showed that frequent snacking, fried food consumption at least three times per week and low intake of daily fruits and vegetables were common among the sampled University students.

Young adults increasingly use social media to share images, videos, and opinions on various areas including food (Filippone et al., 2022). The result of this study showed that there was no significant relationship between social media use and the eating behaviour of undergraduates. This suggests that using *technology that allows the sharing of ideas and information might not affect students' food and beverage consumption habits*. In contrast, Sidani et al. (2016) reported that students who spend more time on social media had poorer eating behavior and were more likely to consume fast food and sugary drinks. Findings further showed that compared to others, more respondents who were emotional over-eaters and hungry eaters used social media more frequently than their counterparts. This suggests that excessive use of social media among students could

result in emotional overeating which is eating more as a way of suppressing or soothing negative emotions, such as stress, anger, fear, boredom, sadness, and loneliness (Pruthi, 2022). Again, excessive use of social media could result in students who are often so hungry that they experience stomach rumbling and lightheadedness when they miss meals.

Social media outlets are no longer just an avenue to connect with friends but are increasingly a mechanism for consumers to learn about food (Reau, 2013). This study revealed that there is no significant relationship between social media use and food preferences of undergraduates in University of Nigeria. The implication is that using communication websites does not in any way exert influence on the students' personal like or dislike of a particular food or food group. This could be because they had knowledge of healthy eating and were thus aware that the low-cost processed high energy foods (Idongesit& Oto, 2023) commonly advertised on social media, such as fast foods, energy drinks, sweet and chocolate products, were unhealthy. This finding contradicts the research by Vaterlaus et al. (2015) which showed that social media platforms allow students to interact with their friends and inform others about their food choices through restaurant reviews, pictures, and posts, hence allowing users to influence each other's food choices.

Conclusion

The study aimed to investigate the influence of social media use on the

eating behavior and food preferences of undergraduate students at the University of Nigeria, Nsukka. WhatsApp emerged as the most common social media platform, with an overwhelming 96.2% adoption rate among students. The students generally used social media occasionally, typically spending 1 to 3 hours daily on these platforms. Eating behaviors among students revealed a greater prevalence of emotional under eating and hungry eating behavior. While most students expressed positive food preferences for snacks and dairy, a few exceptions existed, mainly concerning certain vegetables. Social media use was not significantly associated with eating behaviours and food preferences of the respondents. This underscores the importance of addressing emotional well-being and nutrition-related issues among undergraduates.

Recommendations

Based on the findings of the study, the following recommendations were given.

1. Given the prevalence of emotional under eating behavior, universities should prioritize mental health awareness and support services to address emotional well-being among students.
2. School authorities in conjunction with nutrition-related departments should design nutrition education programs that cater to the diverse food preferences of undergraduate students, utilizing social media platforms for accessible and engaging nutritional information.

3. Students should be encouraged to be mindful of social media's potential influence on their eating behaviors and to make informed choices regarding the content they engage with.
4. Regular assessment of students' eating behaviors and food preferences should be conducted by relevant fields to adapt strategies and interventions as needed.

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Effect of Processing Methods on the Sensory Property and Micronutrient Compositions of African Spinach and Fluted Pumpkin Leaves

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Abstract

This work assessed the effect of processing methods on the sensory properties and micronutrient content of African spinach and fluted pumpkin leaves. Using an experimental study design, six samples of each of the vegetables were processed into squeezed, blanched, fresh-dried, squeezed-dried, and blanched-dried, with the fresh leaves as the control. These samples were subjected to mineral and vitamin analysis while sensory evaluation was performed on egusi soup cooked with processed vegetables using standard methods. The result of the sensory evaluation indicated that squeezed pumpkin (SP) and squeezed African spinach (SAS) were the most preferred in terms of general acceptability with scores of 8.50 ± 0.26 and 8.50 ± 0.25 respectively. Squeezed dried Pumpkin (SDP) and blanched dried African spinach (BDAS) were the least accepted, with a score of 5.35 ± 0.58 and 5.29 ± 0.34 respectively. Higher concentration of Beta carotene, vitamin C, calcium, iron, sodium, potassium and magnesium were found in the fresh control. Blanching, squeezing, and drying significantly ($p < 0.05$) decreased the micronutrient content of the vegetables. The findings of this study showed that squeezing can be an alternative method to blanching and drying for processing African spinach and fluted pumpkin for egusi soup, in terms of acceptability. Direct air-drying of pumpkin and African spinach (DP and DAS) preserved most of the micronutrients, therefore, dried shelf-stable products can be used to ensure food security.

Key words: African spinach, Fluted pumpkin, Blanching, Squeezing, Drying.

Introduction

African spinach (*Amaranthus hybridus*) and Fluted pumpkin (*Telfairia occidentalis*) leaves are prominent leafy vegetables widely consumed across

Africa especially in Nigerian cuisine (Noah and Alaba, 2020). Fluted Pumpkin is referred to as *Eweroko* in Yoruba, *Kabewa* in Hausa and *Ugu* in Igbo land (Ogori et al., 2015). African

Spinach is referred to as green in the local market, *Inine* in Igbo, *Efo tete* or *teteleegun* in Yoruba, *allayahu* in Hausa and *alefu* in Tiv.

African Spinach leaves and fluted pumpkin are available all year round especially in Benue but are more abundant and cheaper during wet seasons. These vegetables are highly perishable due to their high water content and the non-availability of adequate storage and processing facilities to ensure shelf-stability (Pande et al., 2000).

These green leafy vegetables provide a cheap source of vitamins, minerals and dietary fibre (Akpasi et al., 2023). They are an excellent source of vitamins A, C E, K and vitamin B9. Minerals such as calcium, iron, magnesium, potassium, phosphorus and sodium (Akanbi et al., 2007). These vegetables are not only valued for their nutritional benefits but also their sensory attributes, including taste, texture, aroma and colour.

African spinach and fluted pumpkin leaves are usually subjected to various methods of preparation and cooking such as washing, shredding, squeezing, blanching, boiling, steaming and drying to preserve their nutrients, improve their palatability, ensure food safety and extend their keeping quality (Oboh & Aigbe, 2011). The method used depends on the choice of the person and how it should be served as an accompaniment, in soups, stews or sauces (Darkwah, 2013). Each processing method can impact the sensory attributes of African spinach and fluted pumpkin

leaves differently, ultimately affecting consumer acceptance and preference. These indigenous vegetables have been under-exploited, especially in the northern part of the country particularly Benue state of Nigeria, where their usage is limited to inclusion in soups and sauces. Most often times, these vegetables are prepared using household techniques that affect their nutritional availability and sensory properties. Evaluating these household processing techniques will enlighten consumers on the specific methods these vegetables can be prepared to ensure nutrient retention, satisfy consumer's organoleptic desires and ensure food security. This study sought to process African spinach and fluted pumpkin using methods like blanching, squeezing, drying, squeeze-drying and blanch-drying and determine the micronutrient content of the different processed samples and their sensory characteristics in egusi soup.

Materials and Methods

Study design: The study design used in this study is experimental study design.

Material procurements and preparations: Six bunches of 200 g per weight each of freshly harvested African Spinach (*Amaranthus Cruentus*) and fluted pumpkin (*Telfairia occidentalis*) were procured at ₦100 each from Wurukum market, Makurdi, Benue state. The fresh vegetable samples were loosely packed in a sack in order to minimize heat build-up and maintain freshness, and then taken to the laboratory for further processing.

African spinach and fluted pumpkin processing: African spinach and fluted pumpkin leaves were processed separately to get six samples each. The green leafy vegetable samples were separated from the stalks and washed separately in 5% salt-water concentration to remove adhering dirt and also to get rid of microorganisms, insecticide and pesticides which may be on the leaves, followed by rinsing with running tap water and set aside in large plastic sieves to drain the water. The first vegetable samples were cut and kept fresh as the control. The second samples were cut and squeezed by rubbing in between palms to bruise the leaves and kept fresh. The third samples were cut, blanched by submerging the vegetable into boiling

water for 30 seconds. They were immediately drained with a plastic sieve and rinsed with cold water to halt the cooking process and kept aside. The forth samples were cut and spread directly under fan and dried for 24 hours. The fifth samples were cut and squeezed by rubbing in between palms to bruise the leaves and dried under fan for 24 hours; The sixth samples were cut, blanched by submerging the vegetable into boiling water for 30 seconds, immediately draining with a plastic sieve and rinsed with cold water to halt the cooking process, then spread thinly on a sack and dried under fan for 24 hours.

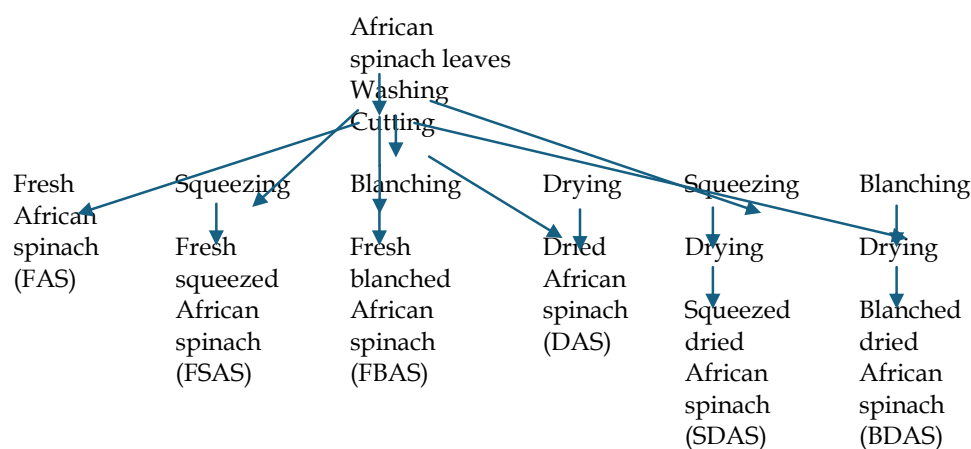


Fig 1: Flow charts for the various processing methods given to African spinach

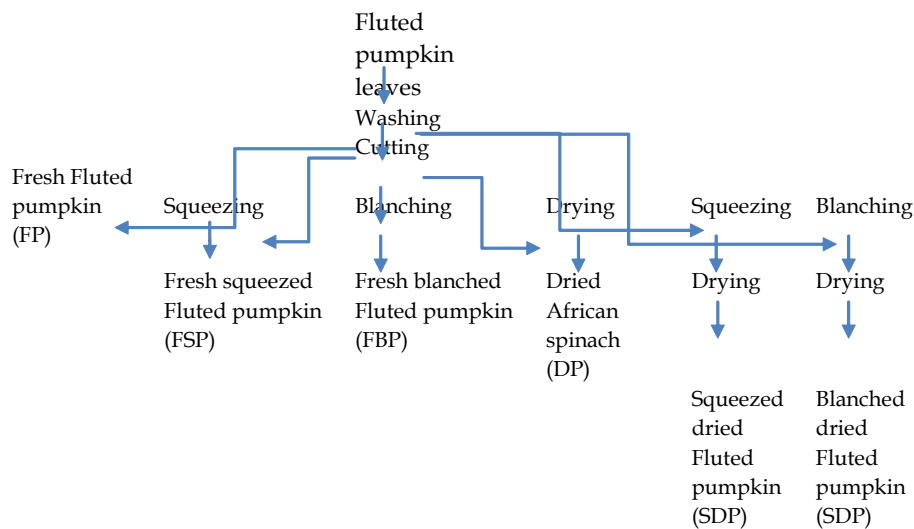


Fig 2: Flow charts for the various processing methods given to Fluted pumpkin

Chemical Analysis: Mineral content (calcium, iron, sodium, magnesium and potassium) of the vegetable samples were determined using Atomic Absorption Spectrophotometry (AAS model UNICAM 969 Solar) as described by AOAC (2012). Vitamin A was determined by the adaptation of the method described by Alexander and Griffiths (1993) where the value of β -carotene obtained was divided by 6 to get a rough estimate of Vitamin A; Vitamin C (Ascorbic acid) content was determined by UV Spectrophotometry and titrimetric method described by Mohammed et al., (2016).

Egusi soup recipe: Egusi soup was prepared using 4 cups of milled melon seeds (egusi), 1 cup blended onions, 1 cup blended scotch bonnet and cayenne pepper mix, 8 cubes of Star maggi, salt to taste, 2 tablespoon of locust bean and 1 cup of palm oil.

Egusi soup preparation: palm oil was heated in a large pot, pepper mix and

onion were added into the oil to fry for 5 minutes, after which 3 cups of water was added. In a separate bowl, blended melon seed was mixed with a little water to form a paste. Lump sizes of the egusi paste were scooped out into the cooking pot and allowed to cook for 15 minutes. The solidified egusi lumps were pressed against the pot wall with a cooking spoon to break out into tiny bits. Blended crayfish, star maggi cubes, salt, and locust bean were stirred into the cooking pot and covered to cook further for 10 minutes. The cooked egusi soup was divided into 12 portions. The processed African spinach and fluted pumpkin leaves samples were each added into egusi soup separately and allowed to cook for 3 minutes.

Sensory Analysis: Six samples each of egusi soup with pretreated African spinach and six samples of egusi soup with pretreated Fluted pumpkin leaves were coded and presented to 20

trained panelists who were familiar with the soup for sensory evaluation. The sensory evaluation was conducted in a standard sensory laboratory, where each of the panelists were positioned in a separate cubicle to avoid interference.

Samples were rated on the following attributes: colour, taste, texture, mouth feel and overall acceptability using a 9-point hedonic scale ranging from 9=like extremely and 1=dislike extremely.

Statistical Analysis: Data collected were entered into Statistical Product for Service Solution (IBM-SPSS), version 21.0. Mean and standard deviation were used to analyse the data. All data obtained were subjected to Analysis of Variance (ANOVA) and the means separated using Duncan's multiple range test to detect significant difference ($p < 0.05$).

Results

Table 1 shows the beta carotene, vitamin C, calcium, iron, sodium, magnesium, and potassium content of different processed African spinach leaf samples. Blanching, squeezing, and drying caused a significant ($p < 0.05$) decrease in all the samples across all the analyzed micronutrients.

The Beta carotene content of African spinach samples was

significantly higher in the control sample FAS (fresh African spinach) (control) ($17.61 \pm 0.01 \mu\text{g}/100\text{g}$) and lowest in squeezed dried African spinach (SDAS) ($43.31 \pm 0.03 \mu\text{g}/100\text{g}$). Vitamin C content was highest in fresh- African spinach- FAS (16.35 ± 0.03) and lowest in squeezed dried African spinach- SDAS ($31.21 \pm 0.03 \text{mg}/100\text{g}$). Calcium content was highest in fresh African spinach- FAS (21.54 ± 0.02) and lowest in squeezed dried African spinach-SDAS ($72.64 \pm 0.03 \text{mg}/100\text{g}$). Iron content was highest in sample fresh African spinach-FAS ($14.15 \pm 0.02 \text{mg}/100\text{g}$) while blanched dried African spinach-BDAS had the lowest value ($39.32 \pm 0.02 \text{mg}/100\text{g}$). Sodium content ranged from 49.31 ± 0.01 to $89.65 \pm 0.01 \text{mg}/100\text{g}$ with fresh African spinach-FAS having the highest while squeeze dried African spinach-SDAS had the lowest value. Magnesium content ranged from 201.96 ± 0.03 to $243.23 \pm 0.030.03 \text{mg}/100\text{g}$ with fresh African spinach-FAS having the highest while blanched dried African spinach-BDAS had the lowest value and potassium content was highest in fresh African spinach-FAS ($133.75 \pm 0.030.02 \text{mg}/100\text{g}$) and lowest in blanched dried African spinach-BDAS ($267.55 \pm 0.02 \text{mg}/100\text{g}$).

Table 1: Micronutrient content of different processed African spinach leaves samples

Sample codes	Beta-Carotene (µg/100g)	Vitamin C (mg/100g)	Calcium (mg/100g)	Iron (mg/100g)	Sodium (mg/100g)	Magnesium (mg/100g)	Potassium (mg/100g)
FAS	43.31 ^a ±0.03	31.21 ^a ±0.01	72.04 ^a ±0.01	39.32 ^a ±0.02	89.65 ^a ±0.01	243.23 ^a ±0.03	267.55 ^a ±0.02
BAS	30.69 ^d ±0.01	22.69 ^d ±0.02	64.18 ^c ±0.03	34.86 ^c ±0.03	52.11 ^d ±0.02	221.29 ^c ±0.01	228.65 ^c ±0.02
SAS	36.45 ^c ±0.03	25.41 ^c ±0.03	54.32 ^d ±0.01	26.67 ^d ±0.01	61.28 ^c ±0.03	218.63 ^d ±0.03	209.12 ^d ±0.01
FDAS	39.69 ^b ±0.02	29.69 ^b ±0.02	68.18 ^b ±0.03	37.86 ^b ±0.03	72.11 ^b ±0.02	231.29 ^b ±0.02	235.65 ^b ±0.03
BDAS	20.26 ^e ±0.03	20.19 ^e ±0.03	21.54 ^e ±0.02	24.24 ^e ±0.03	49.31 ^e ±0.01	201.96 ^f ±0.03	157.34 ^e ±0.03
SDAS	17.61 ^f ±0.01	16.35 ^f ±0.03	29.29 ^f ±0.02	14.15 ^f ±0.02	46.82 ^f ±0.03	207.63 ^e ±0.03	133.75 ^f ±0.02

Values are means ± SD of triplicate determinations. Means within the sample column bearing different superscript are significantly different (p<0.05).

Key: FAS: Fresh African Spinach, BAS: Blanched African Spinach, SAS: Squeezed African Spinach, DAS: Fresh Dried African Spinach, BDAS: Blanched Dried African Spinach, SDAS: Squeezed Dried African Spinach.

Table 2 shows micronutrient content of different processed fluted pumpkin leaves samples. It was observed that the control sample FP was significantly (p<0.05) higher in micronutrients than the processed samples while blanching, squeezing and drying caused significant (p<0.05) decrease in all the samples across all the analyzed micronutrients compared to the control.

Beta carotene content of processed fluted pumpkin leaves samples ranged from 15.0±0.02 to 48.15±0.03 µg/100g with the control (FP) having the highest while BDP had the lowest value. Vitamin C content ranged from 22.41±0.03 to 57.43±0.02 mg/100g, with sample FP having the highest while

BDP had the lowest value. The calcium content ranged from 18.58±0.03 to 61.18±0.03 mg/100g with sample FP having the highest while sample BDP had the lowest value. Iron content ranged from 16.26±0.03 to 36.54±0.01 mg/100g, FP having the highest while BDP had the lowest value. The sodium content ranged from 21.75±0.03 to 44.03±0.02 mg/100g, FP having the highest while BDP had the lowest value. The magnesium content ranged from 93.45±0.03 to 123.21±0.02 mg/100g, FP having the highest while BDP had the lowest value and the potassium content ranged from 108.43±0.01 to 134.78±0.03 mg/100g, FP having the highest while SDP had the lowest value.

Table 2: Micronutrient content of samples of different Processed Fluted pumpkin leaves mg/100g

Samples	Beta Carotene	Vitamin C	Calcium	Iron	Sodium	Magnesium	Potassium
FP	48.15 ^a ±0.03	57.43 ^a ±0.02	61.18 ^a ±0.03	36.54 ^a ±0.01	44.03 ^a ±0.02	123.21 ^a ±0.02	134.78 ^a ±0.03
FBP	33.41 ^d ±0.03	42.12 ^d ±0.03	39.51 ^d ±0.03	21.64 ^d ±0.03	31.17 ^d ±0.03	117.65 ^d ±0.03	118.46 ^c ±0.03
FSP	35.69 ^c ±0.03	46.69 ^c ±0.01	42.66 ^c ±0.01	29.43 ^c ±0.02	32.24 ^c ±0.02	119.48 ^c ±0.01	112.91 ^d ±0.01
FDP	38.94 ^b ±0.03	49.32 ^b ±0.02	56.27 ^b ±0.01	34.13 ^b ±0.02	38.73 ^b ±0.02	122.48 ^b ±0.03	132.91 ^b ±0.01
BDP	15.04 ^f ±0.02	22.41 ^f ±0.03	18.58 ^f ±0.03	16.26 ^f ±0.03	21.72 ^f ±0.03	93.45 ^f ±0.03	108.33 ^e ±0.03
SDP	16.79 ^e ±0.03	24.65 ^e ±0.03	19.62 ^e ±0.03	20.74 ^e ±0.03	24.17 ^e ±0.03	96.16 ^e ±0.01	102.45 ^f ±0.01

Values are means \pm SD of triplicate determinations. Means within the sample column bearing different superscript are significantly different ($p < 0.05$).

Key: FP: Fresh Pumpkin, FBP: Fresh Blanched Pumpkin, FSP: Fresh Squeezed Pumpkin, DP: Dried Pumpkin, SDP: Squeezed Dried Pumpkin, BDP: Blanched Dried Pumpkin.

Table 3 shows the result of sensory evaluation of different processed African spinach leaf samples in egusi soup. The sensory score for colour was rated highest for squeezed African spinach (8.50 ± 1.21) and lowest in blanched dried African spinach (5.32 ± 0.67). No significant differences ($p < 0.05$) existed between samples BAS and SAS. The sensory score for taste was highest in blanched African spinach-BAS (7.70 ± 0.73) and lowest in squeezed dried African spinach-SDAS (5.45 ± 0.67). No significant difference ($p < 0.05$) existed between samples FAS, BAS and SAS, and also between samples BDAS and SDAS. The texture attribute was significantly ($p < 0.05$) higher blanched African spinach-BAS (8.75 ± 0.82) and lowest for blanched dried African spinach-BDAS

(5.00 ± 0.73). No significant differences ($p < 0.05$) were observed between samples BAS and SAS, and also between samples BDAS and SDAS. The sensory score for mouthfeel was rated highest for fresh African spinach-FAS (8.69 ± 0.81) and lowest in squeezed dried African spinach-SDAS (5.62 ± 0.32). No significant difference were found between samples FAS and SAS, and also between samples FDAS and BDAS. The General acceptability of the processed African spinach samples was rated highest for squeezed African spinach-SAS (8.50 ± 0.25) while squeezed dried African spinach-SDAS (5.29 ± 0.34) was rated lowest. No significant differences existed between samples BAS and SAS, and also between samples FDAS and BDAS.

Table 3: Sensory evaluation of egusi soups prepared from different processed African spinach leaves

Sample codes	Colour	Taste	Texture	Mouthfeel	General acceptability
FAS	$7.60^b \pm 0.86$	$7.55^a \pm 1.00$	$7.64^b \pm 0.86$	$8.69^a \pm 0.81$	$7.78^b \pm 0.23$
BAS	$8.34^a \pm 0.73$	$7.70^a \pm 0.73$	$8.75^a \pm 0.82$	$7.21^b \pm 0.49$	$8.33^a \pm 0.41$
SAS	$8.50^a \pm 1.21$	$7.45^a \pm 0.51$	$8.60^a \pm 0.81$	$8.62^a \pm 0.23$	$8.50^a \pm 0.25$
FDAS	$6.43^c \pm 0.73$	$6.20^b \pm 0.98$	$6.20^c \pm 0.98$	$6.27^c \pm 0.75$	$6.75^c \pm 0.16$
BDAS	$5.32^e \pm 0.67$	$5.90^c \pm 0.72$	$5.35^d \pm 0.68$	$6.54^c \pm 0.12$	$5.63^c \pm 0.72$
SDAS	$6.03^d \pm 0.73$	$5.45^c \pm 0.67$	$5.00^d \pm 0.73$	$5.62^d \pm 0.32$	$5.29^d \pm 0.34$

Values are means \pm SD of triplicate determinations. Means within the sample column bearing different superscript are significantly different ($p < 0.05$).

Key: FAS: Fresh African Spinach, BAS: Blanched African Spinach, SAS: Squeezed African Spinach, DAS: Fresh Dried African Spinach, BDAS: Blanched Dried African Spinach, SDAS: Squeezed Dried African Spinach.

The result of the sensory evaluation of different processed fluted pumpkin leaves is shown in table 4 below. No significant difference ($p<0.05$) existed between samples FP (fresh pumpkin), FBP (fresh blanched pumpkin) and FSP (fresh squeezed pumpkin) for colour, while (FSP) fresh squeezed pumpkin was rated highest and (BDP) blanched dried pumpkin was rated lowest for colour, with values of 4.90 ± 0.72 and 8.54 ± 0.41 respectively. No significant differences ($p<0.05$) existed between samples FP, FBP and FSP for taste, but sample FBP was rated highest with a sensory score of 8.50. The Texture attribute was observed to be in the range 6.08 ± 0.64 to 8.57 ± 0.22 for squeezed dried pumpkin (SDP) and fresh squeezed

pumpkin (FSP) respectively. No significant differences ($p<0.05$) existed between samples FP and DP and also between samples FBP, DP and BDP. The sensory attribute for mouthfeel was rated highest for FSP while SDP was rated lowest with values of 8.62 ± 0.51 and 5.63 ± 0.67 respectively. No significant differences ($p<0.05$) existed between sample FBP and FSP.

General acceptability of the different processed fluted pumpkin leaves in egusi soup scored highest in sample FSP while sample SDP scored lowest with scores of 8.50 ± 0.26 and 5.35 ± 0.58 respectively. No significant differences ($p<0.05$) existed between samples FP, FBP and DP and also between samples SDP and BDP.

Table 4: Sensory evaluation of egusi soups prepared from different processed fluted pumpkin leaves

Sample codes	Colour	Taste	Texture	Mouthfeel	General acceptability
FP	$8.40^a\pm0.24$	$8.33^b\pm0.24$	$7.89^b\pm0.38$	$7.95^b\pm0.26$	$7.75^b\pm0.17$
FBP	$8.50^a\pm0.48$	$8.50^a\pm0.23$	$7.62^c\pm0.98$	$8.34^a\pm0.55$	$7.12^b\pm0.33$
FSP	$8.54^a\pm0.41$	$8.37^a\pm0.73$	$8.57^a\pm0.22$	$8.62^a\pm0.51$	$8.50^a\pm0.26$
DP	$7.75^b\pm0.49$	$7.55^c\pm0.16$	$7.33^b\pm0.72$	$6.95^c\pm0.72$	$7.42^b\pm0.72$
SDP	$5.20^c\pm0.98$	$6.77^d\pm0.03$	$6.08^c\pm0.64$	$5.63^e\pm0.67$	$5.35^c\pm0.58$
BDP	$4.90^d\pm0.72$	$6.35^e\pm0.26$	$6.34^c\pm0.12$	$6.20^d\pm0.63$	$5.74^c\pm0.15$

Values are means \pm SD of triplicate determinations. Means within the sample column bearing different superscript are significantly different ($p<0.05$).

Key: FP: Fresh Pumpkin, FBP: Fresh Blanched Pumpkin, FSP: Fresh Squeezed Pumpkin, DP: Dried Pumpkin, SDP: Squeezed Dried Pumpkin, BDP: Blanched Dried Pumpkin.

Discussion

Micronutrient

Blanching, squeezing, and drying significantly decreased the concentration of Beta carotene, vitamin C, calcium, iron, sodium, magnesium, and potassium content of both African

spinach and fluted pumpkin leaves. The control samples i.e fresh African spinach (FAS) and fresh fluted pumpkin (FP) had significantly ($p<0.05$) higher concentrations in all the analyzed micronutrients. This implies that processing affected the

micronutrient content of the processed vegetables. Dried samples, particularly Fresh Dried African Spinach and Fresh Dried Pumpkin ranked second to the control samples in terms of their micronutrient contents. This corresponds with the report of Mepba et al. (2007) who also reported higher concentrations of minerals in raw and sun-dried green vegetable samples.

Beta carotene content of different processed samples of fluted pumpkin leaves which ranged from 16.79 ± 0.03 to 43.31 ± 0.03 $\mu\text{g}/100\text{mg}$, is significantly higher than the values reported by Otitoju et al. (2014). While beta carotene content of African spinach which ranged from 16.35 ± 0.03 to 31.21 ± 0.01 $\mu\text{g}/100\text{mg}$ is comparable to the values reported by Rejeki et al. (2023), the values reported in this study were significantly lower than the RDA of $770 \mu\text{g}/\text{day}$ (Ahmed et al., 2023). Beta carotene (vitamin A) is important for the maintenance of healthy eyes and skin, normal growth and reproduction as well as enhancement of immune function (Ukom & Obi, 2018).

According to Oboh (2005) and Sobowale et al. (2010), processing, such as squeezing, blanching, and drying leads to significant losses in the vitamin C content of vegetables. The vitamin C content of different processed samples of African spinach which ranged from 16.35 ± 0.03 to 31.21 ± 0.01 $\text{mg}/100\text{g}$ is comparable to the values reported by Ejoh et al., (2019). The vitamin C content of different processed samples of fluted pumpkin leaves which ranged from

22.41 ± 0.03 to 57.43 ± 0.02 $\text{mg}/100\text{g}$ is comparable to the values reported by Oguguo (2018).

The mineral content of the fresh samples was significantly higher than the squeezed and blanched samples but the dried samples particularly Fresh Dried African Spinach and Fresh Dried Pumpkin ranked second. Otitoju et al. (2014) also reported reduced levels of calcium, iron, sodium, and magnesium iron during the processing of leafy vegetables.

The calcium content of different processed samples of African spinach which ranged from 21.54 ± 0.02 to 72.04 ± 0.01 $\text{mg}/100\text{g}$ and different processed fluted pumpkin samples which ranged from 18.58 ± 0.03 to 61.18 ± 0.03 $\text{mg}/100\text{g}$ is reportedly lower than the $400\text{mg}/100\text{g}$ of RDA of calcium (SON, 2010). This implies that other sources of calcium will be needed to boost the calcium intake per day, especially for pregnant women and growing children. Calcium is required for skeletal formation in foetus and strong bones and teeth (Kayode & Kayode, 2011).

The iron content of different processed samples of African spinach and fluted pumpkin in this study ranged from 14.15 ± 0.02 to 89.65 ± 0.01 $\text{mg}/100\text{g}$ and 16.26 ± 0.03 to 36.54 ± 0.01 $\text{mg}/100\text{g}$ respectively and are significantly higher than the RDA of 10 mg to 15 mg (Oluwole & Agboola, 2018). The high amount of iron recorded here is in line with the observation of Agogbua et al. (2022) who reported that the leaves of fluted pumpkin are rich sources of iron.

However, iron found in plants is non-heme (iron from plant-based foods) and, therefore, is less bioavailable for human absorption unlike the iron from animals which is more bioavailable (Richard and Ines, 2010). Iron is essential for blood production (Gwer et al., 2020).

The sodium content of different processed samples of African spinach was 46.82 ± 0.03 to 89.65 ± 0.01 mg/100g and that of the fluted pumpkin samples ranged from 21.72 ± 0.03 to 44.03 ± 0.02 mg/100g. The values obtained in this study are categorized as low sodium levels. The recommended daily limit is less than 2000mg/day, that is, one teaspoon of table salt (Zubairi et al. (2022). Sodium is required by the body in relatively small amounts to maintain a balance of body fluids and keep muscles and nerves running smoothly (Veniamakis et al., 2022).

The magnesium content of different processed African spinach samples reported in this study (201.96 ± 0.03 to 243.23 ± 0.03 mg/100g) and that of fluted pumpkin (93.45 ± 0.03 to 123.21 ± 0.02 mg/day) were significantly lower than the RDA of 400mg/day for men (Sobowale et al., 2010), but can provide up to 50.49% to 60.81% and 23.36% to 40.80% respectively of the RDA.

The potassium content of different processed African spinach samples which ranged from 133.75 ± 0.03 to 267.55 ± 0.02 mg/100g can only provide 6.7% to 13.4% of the RDA 2000 mg/day (Sobowale et al., 2010). While the different processed fluted

pumpkin samples in the range 102.45 ± 0.01 to 118.46 ± 0.03 mg/100g can provide 5.1 and 5.9 of the RDA for potassium. The values obtained in this study is significantly ($p < 0.05$) lower than the RDA of potassium

Sensory Evaluation

The processing methods used in this study which included blanching, squeezing, and drying had a significant effect on the sensory attributes of these vegetables. The study showed that the general acceptability values of freshly squeezed African spinach and freshly squeezed pumpkin rated higher than the control (fresh African spinach and fluted pumpkin) with sensory scores of (8.50 ± 0.25) and 8.50 ± 0.26 respectively. Although some of the processed samples were not significantly different ($p < 0.05$) from each other, in the evaluated sensory attributes (colour, texture, mouthfeel, and general acceptability), all the samples had acceptable sensory scores, as they were all scored five and above. This implies that processing may not have necessarily altered the sensory properties of vegetables when used for soups. This agrees with the report obtained by Mepba (2007), where vegetable soup samples of processed African spinach and fluted pumpkin scored above 5 in sensory analysis. Egusi soups prepared with freshly squeezed African spinach and freshly squeezed fluted pumpkin were rated significantly higher for colour, texture and overall acceptability. This contradicts the report of Sobowale et al., (2010) where the panelists rated

fresh unprocessed fluted pumpkin higher than treated vegetables. The significantly higher score for colour, texture and overall acceptability observed in fresh squeezed fluted pumpkin and fresh squeezed African spinach could be attributed to the squeezing effect. Squeezing of vegetable breaks down the structures inside and outside of the leaf cells, in turn, softens the tough texture of leaves and also exposes some of the leaf juices (chlorophyll), and the immediate cooking inactivates oxidative enzymes which prevent comingling of the leaves with the substrate (soup) that allows discoloration of the leaves (Pelalak, 2021). Green vegetables that retain or intensify their greenish colour after cooking imply that most of the nutrients are still available and not destroyed by heat (Marangoni, 2017).

Fresh blanched African spinach and fresh blanched fluted pumpkin were rated significantly higher for taste. This may be because blanching inactivates enzymes responsible for flavor, hence stabilized the flavor components of the vegetable in egusi soups. This agrees with the study of Sobowale et al. (2010), that blanching of vegetables also improves the taste of vegetables.

Amongst the dried samples, the lowest likeness to colour of Blanched Dried African Spinach and Blanche Dried Pumpkin could be as a result of the blanching process which has the potential to trigger the production of chlorophyll derived substances (Leite et al., 2018) and on exposure to air

during the drying process, results to a darkish discoloration as a result of oxidation. This contradicts the result of Pandey et al., 2016 that blanching before drying maintained the greenish colour of green peas, this disparity maybe as a result of the difference in the drying method used. The texture profile of BDAS and BDP were noticeably chewy with a fibrous texture. This indicates that BDAS and BDP would likely have more fibre than the other vegetable samples.

Conclusion

The study showed that blanching, squeezing and drying had a significant effect on the micronutrient content of African spinach and fluted pumpkin leaf samples. Amongst the processed samples, drying of the vegetables without intermittent processing such as in dried African spinach and dried pumpkin had the maximum micronutrient retention compared to the other methods. African spinach leaf samples are richer sources of calcium, iron, sodium, and potassium compared to pumpkin leaf samples which are richer in beta-carotene, vitamin C, and magnesium. The micronutrient content of the dried vegetables was comparable to that of the fresh sample, and therefore could provide an alternative form of using the vegetables in traditional soups. Processing also influenced the sensory attributes of the vegetables as acceptance levels were significantly different amongst the different processed samples in egusi soup. Both Fresh squeezed Pumpkin leaves and Squeezed African spinach were the

most preferred sample in terms of colour, mouthfeel, texture and general acceptability, hence Fresh Squeezed Pumpkin and Squeezed African Spinach could be used as an acceptable processing method to satisfy consumer's organoleptic desires.

Recommendations

1. Awareness campaign should be carried out on the importance of drying pumpkin leaves and African spinach using air as the drying medium, as it preserves the greenish colour of vegetables and also extend the shelf life of the vegetables. Thereby curtailing the issues of post-harvest losses and ensuring food security.
2. Nutritionist can encourage people to prepare and consume African spinach and fluted pumpkin leaves using appropriate processing method so as to harness the micronutrients embedded in these vegetables. Pumpkin leaves can be milled stored in a glass jar and be used as nutrient fortificant in gruel and porridges.
3. Further studies are required to determine the proximate composition of the various processed samples of the vegetables in egusi soups. Further work should also be carried out to determine how long the dried products can retain its greenish colour during storage.

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Evaluating the Clothing Interest and Mental Health of Undergraduate Students in the University of Nigeria

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Abstract

The study determined the relationship between clothing interest and undergraduates' mental health at the University of Nigeria. A descriptive cross-sectional research design was employed for the study. A multi-stage sampling technique was used to select 696 undergraduates from five faculties in the university. Three specific objectives guided this study. Clothing Interest Questionnaire and Mental Health Continuum short form were used to collect data. The instruments were validated by three lecturers in the Department of Home Science and Management, University of Nigeria, Nsukka. The instruments were reliable with Cronbach alpha values of 0.78 and 0.86 respectively. The data were analyzed using SPSS version 23.0. Frequency, percentage, and Chi-square were used for data analysis. Results showed that 61.5% of the respondents had an interest in clothes that make them unique, 54.6% were interested in clothing for appearance enhancement, 54.3% had an interest in clothing for experimenting, 59.1% had interest in clothing for security, and 65.7% of the respondents had an interest in clothing that conforms to fashion in vogue. The respondents could belong to more than one clothing interest category. A greater proportion (69.5%) of the respondents had poor mental health. The finding showed that clothing interests for Security ($\chi^2 = 15.49$, $p = .000$) and Uniqueness ($\chi^2 = 12.0$, $p = .002$) were significantly ($p < 0.05$) associated with positive mental health. Clothing interests in appearance, experimenting, security, and fashion were not associated with mental health ($p \geq 0.05$). Although the mental health of the respondents was generally suboptimal, it was not mostly associated with their clothing interests. Mental health services such as counseling services and support groups should be made readily available to the students.

Keywords: Clothing interests, mental health, undergraduate students, University, Nigeria

Introduction

Clothing interest refers to an individual's attitude, beliefs, knowledge, attention, and curiosity

about their own and others' clothing (Cham et al., 2018). Clothing interest relates to an individual's preference for clothing as a fundamental component

of self-expression which has a huge impact on one's identity, culture, and fashion sense (Manglani et al., 2023). An individual's clothing interest is indicated in the degree to which people use clothes experimentally, the amount of time, money, and energy they are prepared to sacrifice for clothing, and their knowledge of current fashions (Cham et al., 2018).

Clothing interest is multidimensional, encompassing individual's concern with physical appearance, experimentation with appearance, increased knowledge of clothing, improved personal security, and enhanced uniqueness (Gurel & Gurel, 2009). Several factors affect young people's clothing interests such as verbal promotion of the clothing items, perceived quality, originality, self-concept, and brand image (Cham et al., 2018). Chandel et al. (2019) identified four types of clothing interests among young people which are clothing for appearance, experimenting, security, and uniqueness. Appearance is the type of clothing interest characterized by a focus on how one's clothing enhances their physical appearance and attractiveness. Individuals with a strong appearance-based clothing interest prioritize clothing choices that help them feel confident, attractive, and in line with societal beauty standards. Experimenting clothing interest involves trying out new and diverse clothing styles, trends, and looks. People with this interest enjoy exploring different fashion choices, breaking away from their usual style,

and being open to creative expression through clothing. Clothing interest related to security centers around comfort, practicality, and a sense of protection. Individuals with a security-based interest prioritize clothing that provides physical comfort and emotional security, choosing items that make them feel safe and at ease in various situations. Uniqueness clothing interest is characterized by a desire to stand out and express individuality through clothing. People with this interest seek clothing items that set them apart from others, focusing on pieces that are unconventional, rare, or personalized (Chandel et al., 2019). While it may appear trivial, a one's interest in what he or she wears is a strong tool for identifying and addressing mental health concerns (Fraser, 2022).

Mental health is a state of balance between the individual and the surrounding world; state of harmony between oneself and others and a state of co-existence between the realities of the self and that of other people and the environment (WHO, 2013). A person in good mental health is in a balanced relationship with the outside world, with others and with themselves, and with the realities of their own life coexisting with those of others and the surroundings (WHO, 2022).

Positive mental health refers to a sense of well-being, emotional equilibrium, and the ability to manage one's life, maximize potential, and contribute to society, thus encompassing the psychological,

emotional, intellectual, social, and spiritual development (Barry, 2009). The concept of positive mental health is based on the idea that mental health is not simply the absence of mental illness, but rather a positive state of well-being that includes a range of positive emotions, thoughts and behaviors (Keyes & Simoes, 2010). Positive mental health is crucial for managing stress, relating to others, and making positive choices, therefore maintaining good mental health boosts feelings of usefulness, happiness, and satisfaction, leading to a fulfilling life (Sutton, 2019). Positive mental health is closely linked to physical health, as poor mental health is associated with several health and social outcomes such as higher alcohol, tobacco and illicit substance use, adolescent pregnancy, school dropout and delinquent behaviors (WHO, 2012).

Clothing interest and mental health are intricately connected, as one's clothing choices can have a significant impact on their psychological well-being. Clothing attributes can significantly impact moods and emotions, because of the multi-sensory aspects, social factors, and symbolic associations (Moody et al., 2010). Dressing in a way that helps a person feel confident and empowered may boost mood and alleviate anxiety and negative affect. Wearing clothes that make an individual feel good about their body boosts their self-esteem and promotes positive body image which in turn can contribute to better mental health outcomes (Entwistle, 2015). In addition to being symbolic of the self,

clothing interests are significant in enhancing the self. When used positively, clothing contributes to feelings of self-acceptance and self-esteem. For instance, while some students might prefer wearing outfits that enhance their physical appearance, some look up to celebrities or significant people and try to identify with their fashion styles, while others are interested in outfits that will make them stand out among their colleagues (Chandel et al., 2019). The way students choose their outfits for school represents their different personalities and identities (Noh et al., 2015). Poor clothing interest can have psychological consequences such as negative body image, low self-esteem, and other mental health disorders (Ajwani, 2020).

Mental health issues among young people particularly university students are currently of global concern. Various studies across the globe have highlighted the high prevalence of mental health challenges among university students (Eisenberg et al., 2009; Keyes et al., 2012; Nnubia et al., 2020). Mental health problems can affect a student's energy level, concentration, dependability, mental ability, and optimism, hindering performance. Poor mental health can have important effects on the wider health and development of adolescents and is associated with several health and social outcomes such as higher alcohol, tobacco and illicit substance use, adolescent pregnancy, school dropout and delinquent behaviors (WHO, 2014)). Mental health of

students has been found to be intricately connected with various facets of their lives, ranging from their personality to their choices. Hence, this study seeks to assess clothing interests and mental health status of undergraduates in the University of Nigeria, Nsukka, and the association between the variables.

Objectives of the Study: The specific objectives of the study are to:

1. identify the clothing interests of undergraduate students in the University of Nigeria.
2. assess the mental health of the undergraduate students and
3. Determine of the relationship between the clothing interests and the mental health of those students.

Methodology

Study Design: The study used a descriptive cross-sectional survey design. A cross-sectional study is a type of observational study that analyzes data from a population or a representative subset at a specific point in time (Simkus, 2023).

Study Population: The study population consists of 39,295 undergraduate students studying in the 17 faculties in the Nsukka and Enugu campuses during the 2021/2022 session.

Sample Size and Sampling Technique: The study adopted a multi-stage random sampling technique in selecting the samples. The first stage involves the random sampling of three (30%) out of ten faculties in University of Nigeria Nsukka and two (30%) out

of seven faculties in University of Nigeria Enugu Campus. The three Faculties selected from the University of Nigeria Nsukka were Pharmacy, Education and Agricultural Sciences while the two Faculties selected from the University of Nigeria Enugu Campus include Basic Medical Sciences and Environmental Sciences. In stage two, online sample size calculator by Survey Monkey was used to determine the sample size for each university using this formula:

$$n = \frac{z^2 \times p(1-p)}{e^2} \times \frac{1 + [z^2 \times p(1-p)]}{e^2 N}$$

Where n = sample size

z = level of confidence (1.96)

p = baseline levels of the indicators (0.5 or 50%)

e = margin of error (0.05 or 5%)

N = population size

The sample size calculation gave a total of 696 undergraduate students, 368 from University of Nigeria Nsukka and 328 from University of Nigeria Enugu Campus. In stage three, a simple random technique was used to select 50% of the departments in each faculty. The sample size computed for each faculty were selected from the chosen departments. Students who gave their consent participated in the study.

Instrument for Data Collection: Data were collected using two instruments titled Clothing Interests Questionnaire and Mental Health Continuum Short-Form (MHC-SF). The Clothing interest questionnaire was used to obtain information on the clothing interests of

the respondents. This questionnaire was adapted and modified from the instrument used by Chandel et al. (2019) in assessing clothing interests of young people in India based on four interest categories; Appearance, Experimenting, Security, and Uniqueness. An additional clothing interest; Fashion Conforming was added in this study. The questionnaire was divided into two sections. Section A was used to obtain information on the demographic and socio-economic characteristics of the respondents. The section B was further divided into six sub-sections based on the clothing interests. Appearance and experimenting sub-sections each had 6 items while the rest contained 5 items. The instrument was rated on a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

The Mental health continuum short form (MHC-SF) consists of 14 items that represent three components of well-being. Emotional well-being has three items, psychological well-being has six items and social well-being has five items. These response options assess the frequency with which respondents experienced each symptom of positive mental health within the past 30 days. The response options consist of a 6-points ranging from 0 "never" to 5 "every day".

Validation and reliability test of the instrument: The standardized instruments were validated by three lecturers from the Department of Home Science and Management. Their suggestions and observations were used to improve the questionnaire

items. The reliability of the test instrument was obtained using the Cronbach Alfa reliability test. The questionnaire was administered to 20 respondents from two departments. The 20 respondents were selected from the faculties which were not a part of the sample. The Cronbach Alpha reliability coefficient values of the two instruments were 0.873 and 0.831 respectively and both were considered reliable.

Ethical Clearance: Ethical approval for the study was obtained from the University of Nigeria Teaching Hospital Ethical Committee on Research Projects with the approval number; NHREC/05/01/2008B-FWA00002458-1RB00002323.

Informed Consent: The researchers fully explained the study's protocol to the participants, and the questions were answered to the participants' satisfaction. The respondents were given an informed consent form to sign. Only willing participants were enlisted for the study.

Method of data collection: Two undergraduate students in Nutrition and Dietetics and Nursing Sciences of the University of Nigeria, Nsukka, and Enugu campuses respectively were recruited by the researcher, to serve as research assistants in administering the questionnaires. The researcher briefed them on the purpose of the research, the content of the questionnaire, and the data collection procedure. The instruments were administered to students in the different classes/ lecture halls of their departments by direct face-to-face

contact and given by hand. The items were explained to them, and their questions were answered immediately. It took about five minutes or less for the respondents to fill out and return the questionnaire. Six hundred and ninety-six copies of the questionnaire were distributed, and all (100%) were returned. The data collection process took a total of two weeks.

Data and Statistical Analysis: The data collected were coded and analyzed using the computer software package, Statistical Product for Service Solution (SPSS) version 23.0. The clothing interest of the respondents was determined by computing their total scores on all the categories. The total obtainable scores for Appearance and Experimenting are 6 -30, while the other clothing interest scores ranged from 5 to 25. For the Appearance and Experimenting sub-sections, all the respondents who scored 6 - 12 were grouped as low interest, 13 - 19 as moderate interest, and 20 -30 as high interest. For the Security, Fashion Conforming, and Uniqueness sub-sections, a score range of 5 -10 corresponds to low interest, 11 - 19 was categorized as moderate interest and 20 -25 was the high-interest category. Respondents were categorized as “flourishing” and “not flourishing” mental health. Flourishing mental health was defined by responding “every day” or “5-6

times a week” on at least 1 out of 3 emotional wellbeing items, and 6 out of the 11 items of combined social and psychological subscales. Those who did not meet this criterion are classified as “Not flourishing.” Higher scores indicate greater levels of positive well-being. The results were analyzed using frequencies and percentages. Chi-square was used to define the relationship among variables at a 0.05 level of significance.

Results

Demographic characteristics of the respondents

The respondents comprised 56.6% females and 43.1% males, mostly (72.1%) between 18-25 years of age. A good number (65.1%) were Igbos, 18.1% were Yoruba, and 5.6% were Hausa. About a third (30.9%) of the respondents lived in the hostels and 69% lived off campus. The majority (81.6%) of the respondents were single, 14.4% were married, and 3.8% were divorced/separated/widowed. More than a third (38.6%) of the respondents were in the faculty of Agriculture, 20.3% were in Pharmacy, 15.8% in Education, 14.7% in Basic Medical Sciences, and 10.6% were in Environmental Sciences. A good number (32.5%) were final-year students, 22.3% were in the 100 level and 45.1% were in other levels.

Table 4.1: The Socio-demographic characteristics of the Respondents

Variables	Frequencies (F)	Percentage (%)
Gender		
Male	300	43.10
Female	394	56.60

Age		
Less than 18 years	55	7.90
18-30years	628	90.20
Above 30 years	13	1.90
Ethnicity		
Igbo	453	65.10
Yoruba	127	18.20
Hausa	39	5.60
Others	37	11.10
Residence		
Hostel	215	30.90
off Campus	481	69.10
Marital Status		
Single	568	81.60
Married	102	14.60
Divorced/Widowed	26	3.80
Faculty		
Pharmaceutical Sciences	141	20.30
Agricultural Sciences	269	38.60
Education	110	15.80
Basic Medical Sciences	102	14.70
Environmental Science	74	10.60
Year of Study		
100 level	156	22.30
Other Levels	314	45.10
Final year	226	32.50

Table 2 shows the clothing interests of the students. From the table, greater proportions of the students were at moderate levels of all the clothing interest groups. Many (41.2%) of the respondents showed high clothing interest for appearance, 39.5% for experimenting, 36.9% for security, 33.9% for uniqueness and only a few (9.6%) showed high interest for fashion-conforming clothing.

Table 2: Clothing Interests of the Respondents

Interest category	High Interest F (%)	Moderate Interest F (%)	Low Interest F (%)
Appearance	287 (41.20)	380 (54.60)	29 (4.20)
Experimenting	275 (39.50)	378 (54.30)	43 (6.20)
Fashion Conforming	67 (9.60)	457 (65.70)	172 (24.70)
Uniqueness	236 (33.90)	428 (61.50)	32 (4.60)

Security	257 (36.90)	411 (59.10)	28 (4.00)
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F; frequency, %; percent

Figure 1 shows the mental health status of the respondents. From the figure, the majority (70.0%) of the respondents were not flourishing while 30.0% of them were flourishing.

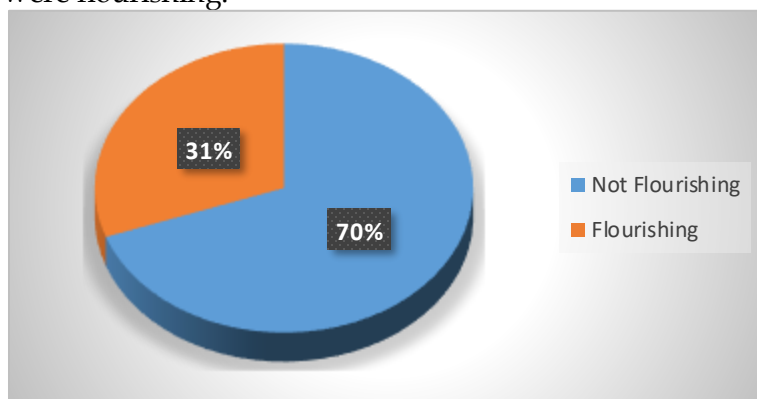


Figure 1: Mental health status of the respondents

Table 3 shows the relationship between clothing interests and the mental health of the respondents. From the table, clothing interests in security and uniqueness were significantly ($P < 0.05$) associated with mental health. Moderate security and uniqueness had the highest proportion (35.8% and 35.0%) respectively of those flourishing in mental health. Appearance, experimenting, and fashion-conforming clothing interests were not associated with the mental health of the respondents.

Table 3: Relationship between the Clothing Interests and Mental Health of Respondents

Categories	Not Flourishing F (%)	Flourishing F (%)	Chi-square (χ^2)	P Value
Appearance				
Low Interest	23 (79.3)	6 (20.7)	1.99	.371
Moderate Interest	258 (67.9)	122 (32.1)		
High Interest	203 (70.9)	84 (29.3)		
Experimenting				
Low Interest	35 (81.4)	8 (18.6)	3.76	.153
Moderate Interest	255 (67.5)	123 (32.5)		
High Interest	194 (70.5)	81 (29.5)		
Security				
Low Interest	25 (89.3)	3 (10.7)	15.49	.000*
Moderate Interest	264 (64.2)	147 (35.8)		
High Interest	195 (75.9)	62 (24.1)		
Fashion-				

Conforming				
Low Interest	126 (73.3)	46 (26.7)	1.49	.474
Moderate Interest	312 (68.3)	145 (31.7)		
High Interest	46 (68.7)	21 (31.3)		
Uniqueness				
Low Interest	27 (84.4)	5 (15.6)	12.0	.002*
Moderate Interest	278 (65.0)	150 (35.0)		
High Interest	179 (75.8)	5.7 (24.2)		

F; frequency, %; percent

Discussion

Clothing interests are significant in the enhancement of self. When used positively, clothing contributes to feelings of self-acceptance and self-esteem. It is evident from the research findings that clothing choices serve various purposes for the surveyed individuals. The most common clothing interest among the respondents was based on appearance. A substantial number (41.2%) of the respondents expressed a high interest for clothing that promotes an individual's physical appearance. This indicates the importance of aesthetics in their clothing choices, reflecting a desire to present them in a visually appealing manner. The prominence of appearance underscores the influence of societal standards and personal grooming in the respondents' clothing decisions. More than a third of the students also showed high interest in clothing for uniqueness, experimenting, and security. Having a high interest in clothing for uniqueness suggests that the individuals value clothing as a means of expressing their individuality and distinguishing themselves from others (Chandel, 2019). This inclination towards uniqueness highlights the role of

clothing in shaping one's identity and personal style (Boomsma, 2020). The respondents who displayed a high interest in clothing experimentation underscored the evolving nature of fashion in the contemporary world. Clothing, once constrained by societal norms, has evolved into a dynamic avenue for self-expression and individuality and experimenting with clothing opens doors to creativity and self-discovery. Additionally, the participants who preferred clothing for security indicate that clothing provides them with a sense of comfort and protection. This observation points towards the psychological aspect of clothing, where individuals seek garments that make them feel secure and shielded from external influences. Interestingly, only a few had high interest with the majority (65.7%) having a moderate interest for fashion-conforming clothing. This suggests that a small portion of the sample is influenced by current fashion trends and seeks to align with prevailing styles. Clothing does not just affect how others perceive us but also influences our cognitive processes and behaviors (Adam & Galinsky, 2012). This desire for fashion conformation highlights the role of societal norms

and the media in shaping individuals' clothing choices. Clothing interest, a fundamental aspect of human behavior, plays a pivotal role in the way individuals express themselves, navigate social interactions and construct their identities (Oberhagemann, 2023).

Mental health enables individuals to develop their abilities and face the stress of daily life (WHO, 2013). The study's results shed light on the diverse spectrum of mental well-being among the participants. Notably, less than a third (31%) of respondents in this current research reported flourishing in mental health. Flourishing individuals exhibit a higher degree of psychological well-being, characterized by positive emotions, resilience, and a sense of purpose (Keyes & Simoes, 2010). This mental well-being of this subgroup could be attributed to various factors such as strong social support systems, effective coping mechanisms, and favorable life circumstances. On the other hand, the research findings also point out a concerning 69.5% of respondents who were categorized as not flourishing in mental health. This majority group faces challenges that impact their overall mental well-being, possibly indicating experiences of distress, lack of positive emotions, and decreased life satisfaction. Identifying these individuals is crucial for tailoring targeted interventions and support mechanisms to uplift their mental health. The varying proportions of respondents falling within each mental health category reflect the complex

nature of psychological well-being. A study by Eisenberg et al. (2009) found that university students have a higher risk of mental health problems than the general population. The study found that 30% of university students reported feeling overwhelmed, 15% reported experiencing symptoms of depression and 10% reported having suicidal thoughts. Mental health assessment is a systematic process that involves evaluating an individual's psychological well-being, emotional state, and cognitive functioning (Holly, 2022). Assessing the mental health of individuals plays a crucial role in diagnosing mental health disorders, monitoring treatment progress, and guiding interventions (Sokoll, 2023). The study underscores the need for comprehensive mental health strategies that cater to individuals across the entire spectrum, promoting both recovery and enhancement. The research findings advocate for the importance of promoting positive mental health outcomes, while also addressing the needs of those facing mental health difficulties. Mental health is integral to living a healthy, balanced life (Wani, 2023). People in good mental health could still feel sad, unwell, angry or unhappy, which natural human emotions are. However, mental health has been often conceptualized as a purely positive effect, marked by greater feelings of happiness and a sense of mastery over the environment (Lamers, 2012). Centers for Disease Control and Prevention, (2023) noted that mental

health affects how individuals think, feel, and behave.

Clothing interest is multi-dimensional and consists of five components or dimensions: concern with physical appearance, experimentation with appearance, heightened awareness of clothing, enhancement of personal security and enhancement of individuality (Gurel & Gurel, 2009). This study highlighted various facets of the relationship between the respondents' clothing interests and mental health. Having a moderate interest in clothing appears to enhance mental health particularly in the aspects of security and uniqueness. These findings show that clothing interests have a discernible influence on the mental well-being of the surveyed undergraduates. The correlation between certain clothing choices and levels of mental health sheds light on the multifaceted interplay between self-expression, self-perception, and psychological state (Entwistle, 2015). While clothing choices can serve as a tool for self-expression and boosting self-esteem, they can also be influenced by societal pressures and internal perceptions (Chandel et al., 2019). Acknowledging these complexities are imperative when interpreting the findings and designing interventions to foster positive mental health outcomes.

Conclusion

The research findings show that the majority of the respondents showed moderate clothing interests in the dimensions of appearance, experimenting, security, fashion-

conforming, and uniqueness. They also showed a high proportion of sub-optimal mental health. The study also showed that clothing interests at a moderate level have a possible influence on the mental well-being of the surveyed undergraduates. The association between certain clothing choices and levels of mental health sheds light on the multifaceted interplay between self-expression, self-perception, and psychological state. The presence of a significant relationship underscores the importance of considering clothing interests as a potential indicator of an individual's mental health. While clothing choices can serve as a tool for self-expression and boosting self-esteem, they can also be influenced by societal pressures and internal perceptions. Acknowledging these complexities is imperative when designing interventions to foster positive mental health outcomes. As the academic and professional landscape evolves, the significance of mental health and its intersections with various aspects of life, including clothing interests, becomes more pronounced. This study emphasized the role of clothing choices as a potential avenue for promoting mental well-being. Its implications extend beyond the academic realm, serving as a foundation for initiatives aimed at raising awareness, guiding counseling interventions, and promoting a holistic approach to student well-being.

Recommendations

Considering the significance of the study's findings, several key recommendations can be drawn:

- a. Universities and institutions of higher learning should consider integrating discussions on self-expression, body image, and mental health within their curriculum/programmes and support services. By fostering an environment that promotes positive self-perception and embraces diverse expressions of identity, institutions can contribute to the overall mental well-being of their students.
- b. Workshops, seminars, and awareness campaigns could be organized to empower students with knowledge about how clothing choices can impact self-esteem and overall mental well-being.
- c. Resource Allocation: The university administration should allocate resources to support mental health services, workshops, and awareness campaigns that address the interconnectedness of clothing interests and psychological well-being

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Assessment of Coping Strategies Adopted by Parents of the Children in Kwara State School for Special Needs

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Abstract

Parents of children with special needs have to deal with unique challenges that require special strategies to cope with. Therefore, this study assessed coping strategies among parents with children with special needs in Kwara State. Five research objectives were raised and translated to research questions. A stratified random sampling technique was used in selecting a total of 100 respondents from the study area. The instrument used was a questionnaire. Data were analyzed using a mean, standard deviation. The findings of the study revealed that parents of special needs children face different challenges associated with parenting, such as financial implication ($\bar{x}=1.50$), accessibility of suitable school ($\bar{x}=1.63$), and securing appropriate educational resources ($\bar{x}=1.73$). Some coping strategies they adopted include learning about the child's special needs from child healthcare providers ($\bar{x}=2.34$), praying and believing in the child ($\bar{x}=2.69$), cooperating with school staff on special need education ($\bar{x}=2.38$). It can be concluded that parents adopt adequate coping strategies that effectively manage their special needs children and greatly influence the academic and social outcomes of their special needs children. It was recommended that the government should provide funding to local community centers to create and maintain support groups for parents of children with special needs.

Keywords: Special needs children, Parents, Challenges, Coping strategies, Child outcome.

Introduction

Special needs children are the children who, for some developmental or acquired challenges, cannot benefit from regular school and are provided with special education (Lateef, 2019). These challenges often stem from disabilities, which refer to physical or mental impairments that significantly

affect a person's ability to perform daily activities. Such disabilities can limit children's self-help capacity, necessitating tailored educational approaches. Children with special need are categorized into three major classes, viz: visually disabled, hearing disabled and intellectually disabled. These categories of children are to be

educated, hence their presence in the school system in to equip them with skills and knowledge that will enable them to be useful to themselves, their parents and society at large (Umar, 2022).

The school majorly organized for people with special needs is referred to as the school for special needs. Special needs schools play an important role in fostering an inclusive and supportive environment for children with disabilities. These institutions are designed to offer specialized instruction and resources tailored to the unique learning needs of each student. The benefits of these schools include enhanced access to individualized education plans, adaptive technologies, and trained professionals who are equipped to address the various needs and wants of their students. This specialized support helps to mitigate the risks of social exclusion and bullying, often encountered by children with special needs in mainstream settings. For instance, a study by Vyrastekova (2021) found that the social inclusion of students with special educational needs was not affected by the type of school they attended, but rather by the school's inclusive characteristics, suggesting that special schools can provide a nurturing environment that promotes social integration. Furthermore, special needs schools can serve as a safe haven from discrimination by peers, groups, family members, or schoolmates, which not only impacts the morale of the children but also affects their

families. Children with developmental disabilities, who might otherwise socially exclude themselves, and those with learning difficulties, who are prone to socio-emotional behavioral disorders, can find a sense of belonging and understanding within the specialized setting of a special needs school (Estogero, 2022).

According to Sharief (2014), as cited in Borah & Bogoi (2021), parents find it quite stressful to accept the disability of their child and if they had a severe impairment, greater dependency and discomfort are felt among parents. Parents face a lot of questions from others and may become socially isolated in different groups they belong. These parents tend to suffer from higher levels of stress and lower levels of well-being than parents of children without developmental concerns. Society's attitudes and beliefs towards disability may also intensify the level of stress in parents (Neely-Barnes & Dia, 2008).

To manage the challenges they face, parents may actively seek information about their child's special needs and available resources to better understand how to support their child. They may also focus on the positive aspects of their child's abilities and strengths, rather than dwelling on the challenges and limitations (Whittingham et al., 2009). Parents cope by getting assistance from institutions and professionals working with special needs children. They pray and put their faith in God that their child will recover over the years (Borah & Bogoi, 2021). Study by

Chang et al. (2019) concluded that parent use coping strategies such as advocating for their child's rights and needs, seeking educational resources and support, and using technology to manage their child's behavior and communication. According to Ravn and Smith, (2018), parents' coping strategies can have a significant impact on their children with special needs. When parents exhibit effective coping strategies, children with special needs benefit and experience fewer behavioral problems. Conversely, when parents exhibit ineffective coping strategies, children with special needs experience multiple behavioral problems, including aggression and depression (Demšar & Bakracevic, 2021).

Parents of special needs children often have a more stressful life than parents of children with normal development. They go through a variety of stressors resulting from their child's disability. It is observed that parents having children with special needs are affected in many ways which may persist throughout their life (Borah & Gogoi, 2021). Parenting a child with special needs can be an emotionally and physically demanding experience. Parents of these children face unique challenges that require specific strategies to manage (Cheng & Lai, 2023). Despite the growing awareness of special needs education and the availability of resources to support parents, little is known about the coping strategies that parents use to manage their children's special needs in schools. It is in the light of

this that the study examined the coping strategies adopted by parents in dealing with their children's special needs, evaluated the effectiveness of the coping strategies used by parents, and determined the influence of parents' coping strategies on the academic and social outcomes of their children with special needs.

Objectives of the study

The main objective of this study was to assess the coping strategies adopted by parents in dealing with children in Kwara state school for special needs. Specifically, the study:

1. examined the challenges faced by parents in coping with their children with special needs.
2. identified the coping strategies adopted by parents in dealing with children with special needs in Kwara state;
3. evaluated the effectiveness of the coping strategies used by parents in managing their special needs children;
4. assessed the perceived influence of parents' coping strategies on the academic and social outcomes of their children with special needs;
5. determined parents' satisfaction with the level of support received from school staff and the community in coping with their children's special needs

Methodology

Research design: The research design adopted for this study is descriptive survey research design. This is an approach concerned with seeking relationship between two or more

variables as they existed. Survey method of research is concerned with generalized statistics resulting when data are obtained from part of a large number of populations and used to generalize (Wiśniowski et al., 2020).

Population of the study: The population for the study comprised 471 parents of children in Kwara State school for special needs. The school has three units; hearing unit with 369 students, intellectual unit 63 students and visual unit with 39 students.

Sample for the study: In this study, stratified random sampling was employed to ensure that each subgroup within the population was adequately represented in the sample. The population was first divided into three strata corresponding to the units within the school; the hearing the intellectual, and the visual units. A proportionate sampling technique was then used to determine the number of respondents to be selected from each stratum based on their relative sizes. This approach allowed for the selection of a representative sample that reflects the diversity of the entire population. Random sampling was subsequently conducted within each stratum to select the final respondents, resulting in a total sample size of 100 students-parents pair.

Instruments for data collection: The data for this study were collected from primary source with the use of structured questionnaire. The questionnaire was divided into six sections. Section A contains demographic information of the respondents such as age, religion,

education level, type of child need, and gender. Section B elicited data on the challenges faced by parents of children in special needs schools. The items rated on a "4 -point scale ranging from (3 = Severe challenge SC; 2 = Mild challenge MC; 1= challenge C and 0=Not a challenge NC. Section C contained information on the coping strategies adopted by parents of children in school for special needs. The responses of each item were rated on a "4-point scale ranging from 3= Always; 2 = occasionally 1=rarely; 0 = never. Section D obtained data on the effectiveness of coping strategies adopted by the respondents. The items were rated on a "4-point scale ranging from 3 = Very effective; 2 =sometimes effective; 1= rarely effective; 0= not effective. Section E elicited data on the influence of parents coping strategies on the academic and social outcomes of their children. Each item was rated on a "4-point scale ranging from 3 = to a large extent; 2 = to some extent; 1= to a lesser extent; 0= not at all. Section F Find out the level of support received by parents from staff and community and was measured by subjecting the respondent to a list of Support that may be available. Responses of each item was rated on a "4-point scale ranging from (3 = Extremely satisfied; 2 = Very Satisfied; 1=Satisfied; 0= Not satisfied.

Validity of research instrument: To ensure that the instrument gets relevant information required, it was subjected to face validity. The face validation measured the appropriateness of the items by mere looking at the appearance whether it

measure what it sets out to measure for instance, appropriateness of language, relevance of suitability of the items and extent of coverage. The instrument was validated by three experts in department of Home Economics, University of Ilorin.

Reliability of the instrument: To ensure the reliability of the instrument a trial testing was conducted. Twenty (20) questionnaires were distributed to parent of children with disabilities in another school outside the local government where the research was conducted. The questionnaires were subjected to Cronbach alpha statistics and an acceptable reliability coefficient of 0.796 was obtained.

Method of data collection: The questionnaires were distributed by the researcher with the help of two (2) trained research assistants. The research assistants were trained on the rudiments of questionnaire administration, distribution and collection by the researcher. Completed copies of the questionnaire were collected and checked in order to ensure their completeness by the participants. The questionnaire was administered to the parents during Parent Teachers Association meeting. This thorough process resulted in a return rate of 100% (100 copies of questionnaire), indicating a very strong engagement from the participants and providing a robust basis for data analysis.

Data and statistical analysis: Data collected were analysed with the descriptive statistics such as, frequencies, percentages, mean (\bar{x}),

standard deviation (SD). The mean of 1.5 was the benchmark. All items with a mean score ≥ 1.5 were accepted and items < 1.5 were not accepted.

Results

The results of the socio demographic characteristics reveals that 39.0% of the respondents were within the age range 20 and 30 years, fewer proportion 33.0% were in the range of 31 and 40 years, 28% were within the range of 40 and above. Many (66.0%) of the respondents were females while less than half 34.0% were males. Data also reveals that 60.0% of the respondents were Muslims, 40.0% were Christian. Some (46.0%) of the respondents were HND/B.Sc. holders, 21.0% were OND/NCE holders, 19.0% were Secondary School leavers and 14.0% were M.Sc./PhD holders. The result also reveals that 53.0% of the parents had children with hearing needs, 27.0% have intellectual needs and 20.0% had visual needs.

Challenges faced by parents in coping with their children with special needs

Table 1 presents the challenges faced by parents of children with special needs. From the table, the respondents agreed to all the items as challenges they faced as parents of children with special Needs. This means that all the listed statements had mean responses that were higher than the mid-mean score of 1.50. The challenges faced by parents include Balancing my child's needs with my other responsibilities and obligations is a constant struggle ($\bar{x}=1.79$) the high cost of educating

children with special needs (\bar{x} =1.50), difficulty finding an accessible and suitable school placement for special needs children (\bar{x} =1.63), and difficulty securing appropriate educational resources and accommodations for special needs children (\bar{x} =1.78).

Table 1: The challenges faced by parents of children with special needs

Challenges	Mean	Std Dev	Remarks
High cost of educating children with special needs.	1.50	0.66	Agreed
Difficulty finding an accessible and suitable school placement for special needs children.	1.63	0.66	Agreed
Difficulty securing appropriate educational resources and accommodations for special needs children,	1.78	0.71	Agreed
Securing appropriate educational resources and accommodations for my child with special needs poses significant challenges	1.73	0.76	Agreed
Transitioning my child to a new school or educational program presents notable difficulties	1.69	0.74	Agreed
Advocating for my child's needs within the school system is often challenging	1.55	0.67	Agreed
Balancing my child's needs with my other responsibilities and obligations is a constant struggle	1.79	0.71	Agreed
The emotional impact of my child's special needs significantly affects our family life.	1.62	0.70	Agreed
Feelings of isolation or social stigma associated with having a child with special needs are tangible and impactful	1.54	0.66	Agreed

Field Survey, 2023

Coping Strategies adopted by Parents with Special Needs Children

Table 2 below presents coping strategies adopted by parents in dealing with their children's special needs. From the table below, the strategies employed by parents including learning about their child's

special need from child healthcare providers (\bar{x} =2.34), seeking financial support from friends and relatives (\bar{x} =1.79), prayer (\bar{x} =2.69), working with school staff on special needs education (\bar{x} =2.38).

Table 2: The coping strategies adopted by parents in dealing with their children's special needs

Coping strategies	Mean	Std Dev	Remarks
I learn about child's special need from child healthcare providers.	2.34	0.77	Agreed
I seek help from family and share responsibilities in the house with family	2.21	0.92	Agreed
I seek financial support from friends, families and support	1.79	0.98	Agreed

groups			
I pray and have faith in my child	2.69	0.58	Agreed
I work with school staff on special needs education	2.38	0.90	Agreed
I engage in self-care activities such as exercise, relaxation techniques, or hobbies to deal with my emotions	2.29	0.84	Agreed
I use alcohol and drug to cope with the situation	0.74	1.09	Disagreed

Field Survey, 2023

Effectiveness of the Coping Strategies adopted by parents

Table 3 presents data on the effectiveness of the coping strategies used by parents in managing their children's special needs. From the table, the respondents agreed that all the items being effective strategies adopted by parents in coping with

their special needs children (means > 1.5). The table revealed that prayer ($\bar{x} = 1.66$), communication with child's healthcare provider ($\bar{x} = 1.74$), self-care activities ($\bar{x} = 1.74$) and support from family members ($\bar{x} = 1.56$) were effective strategies.

Table 3: Effectiveness of the coping strategies used by parents in managing their children's special needs

Statements	Mean	Std Dev	Remarks
How effective is communicating with your child's healthcare providers about coping strategies and techniques for managing their special needs?	1.74	0.49	Agreed
How effective was prayer?	1.66	0.54	Agreed
Were self-care activities like exercise effective in coping with your child?	1.74	0.49	Agreed
Was working with the school staff on special need education effective?	1.52	0.63	Agreed
How effective is seeking support from family, friends, or other caregivers when managing your child's special needs?	1.56	0.57	Agreed
How effective is the level of support you receive when managing your child's special needs?	1.57	0.59	Agreed

Field Survey, 2023

Perceived influence of the coping strategies on academic and social outcomes of children with special needs

Table 4 presents the perceived influence of parents coping strategies on the academic and social outcomes of their children with special needs. From the table, the respondents agreed

to all the items on how they perceived the influence of coping strategies they adopted on the academic and social outcomes of their children with special needs (means >1.50). The respondents perceived that the strategies improved their children academic performance ($\bar{x} = 1.78$), communication has helped their children make new friends

($\bar{x} = 1.73$) and that the support from the family members enabled their children concentrate more in school ($\bar{x} = 1.52$).

Table 4: Perceived influence of parents' coping strategies on the academic and social outcomes of their children with special needs

Variables	Mean	Std Dev	Remarks
The strategies I adopt have improved the academic performance of my child	1.78	0.46	Agreed
Communicating with my child has helped him/her in making new friends	1.73	0.47	Agreed
The support from the family members has enabled my child concentrate in school	1.52	0.64	Agreed
Self-care activities like exercise has made my child play with other children	1.60	0.57	Agreed
Monitoring from the school staff has improved my child's quality of life	1.76	0.45	Agreed
The coping strategies I employed make my child more independent and resilient	1.57	0.59	Agreed
Communicating with child's health care providers is helpful in improving my child's outcomes	1.72	0.51	Agreed

Field Survey, 2023

Parents' satisfaction with the level of support received from school staff and the community

Table 5 presents parents' satisfaction with the level of support received from school staff and the community in coping with their children's special needs. The respondents were satisfied with the special resources and services like learning aids used by staff to

support the children, the level at which staffs refer you to appropriate state advocacy organization ($\bar{x} = 1.63$) and other training programs that focus on special need children ($\bar{x} = 1.53$) They were dissatisfied with the financial and emotional support received from people in the community ($\bar{x} = 0.83$)

Table 5: Perceived level of support received by parents from school staff and the community

Statements	Mean	Std Dev	Remarks
How satisfied are you with the staff support in special need child education?	1.52	0.57	Satisfied
How satisfied are you with the special resources and services used by staff to support your child e.g. learning aids?	1.63	0.62	Satisfied
How satisfied are you with school guardians of your special need child?	1.53	0.54	Satisfied

Are you satisfied with the level at which staffs refer you to appropriate state advocacy organization and other training programs that focus on special need children?	1.58	0.63	Satisfied
How do you feel when you seek advice from other Special need parent in the community?	1.57	0.67	Satisfied
Are you satisfied with the financial and emotional support received from people in the community?	0.98	0.71	Dissatisfied
Are you satisfied with level at which community advocate for child with special needs	0.98	0.72	Dissatisfied

Field Survey, 2023

Discussion of findings

Findings from research revealed parents of children with special needs face various challenges in caring for their children. These challenges include high cost of educating children with special needs. Difficulty in finding an accessible and suitable school placement for special needs children. This is supported with findings of Leyser and Kirk (2004) which emphasized the importance of appropriate educational placements for students with special needs, as they can significantly impact their academic and social development. Inappropriate placements can lead to a mismatch between the child's needs and the educational services provided, hindering their progress and well-being. Difficulty in securing appropriate educational resources and accommodations for children with special needs can be a daunting task for parents. Soodak and Erwin (2000) noted that parents often face challenges in obtaining necessary services and accommodations for their children due to limited resources, lack

of awareness, or bureaucratic obstacles within the educational system.

Transitioning a child with special needs to a new school or educational program can also present notable difficulties, as mentioned in the findings. Proper planning and support from both the sending and receiving schools are crucial to ensure a smooth transition process. The implications of these challenges can impact the child's overall development, academic achievement, and quality of life. Failure to address these challenges can lead to increased stress and burden on families, potentially affecting their ability to provide adequate care and support for their children.

Study of Borah and Gogoi (2021) revealed that parents having a child with special needs often experience a stressful life than those having a normally developing child. They go through a variety of stressors resulting from their child's disability. They experience a higher level of stress in bringing up their child as they require more parental support and attention as compared to normally developing children. It is observed that parents

having children with special needs are affected in many ways which may persist throughout their life. Raising a child with special needs can be expensive, and parents may face financial strain due to medical bills, therapy costs, and equipment expenses

In coping with these challenges, the findings of this study showed that parents sought help from child healthcare providers, and financial support from friends, families and support groups. They also pray and believe in the capacities of the children. They also engage in self-care activities such as seeking emotional support from groups, practicing relaxation, compassion and mindfulness techniques, engaging in physical activities, maintaining healthy diet among others. These claims are also supported with the studies of Dykens et al., (2014); Benn et al., (2012); Hartley et al., (2010); Whittingham et al., (2009), which posited that Activities such as meditation, deep breathing exercises, yoga, or progressive muscle relaxation can help reduce stress, improve focus, and promote a sense of calm; Joining support groups, either in-person or online, can provide a sense of community, understanding, and shared experiences with other parents going through similar situations; Regular exercise, such as walking, running, swimming, or joining a fitness class, can be an effective way to manage stress and improve overall physical and mental health; Being kind and understanding towards oneself, acknowledging the challenges faced,

and celebrating small victories can help parents maintain a positive outlook and prevent burnout. Fortunately, they do not use alcohol and drugs to suppress their emotions. These findings have agreed with the study of Borah and Gogoi (2021) which posited that parents cope by getting assistance from institutions and professionals working with special needs children. They pray and have faith in God that their child will recover over the years. Also, they enhance their coping strategy through relaxation techniques such as yoga meditation.

The finding of this study further showed that the parents believe their strategies were effective in managing their special needs children. The most effective strategies were communicating with the healthcare professionals, training the child in self-care activities, and engaging in prayers. Other strategies that showed effectiveness include seeking help from family and sharing responsibilities in the house with family, seeking financial support from friends, families and support groups and working with school staff on special needs education. Communicating with healthcare professionals is crucial for parents as it enables them to better understand their child's condition, access necessary resources, and develop appropriate care plans.

Pelentsov et al. (2015) noted that promoting self-care skills can foster independence and autonomy in children with special needs, positively

impacting their self-esteem and overall well-being. Additionally, equipping children with self-care abilities can alleviate some of the caregiving burdens on parents.

Engaging in prayers, as mentioned in the finding, is supported by research on the importance of spiritual and religious beliefs in managing stress and adversity. Tarakeshwar and Pargament (2001) found that religious coping can provide parents with a sense of meaning, comfort, and emotional support, which can be beneficial in dealing with the challenges of raising a child with special needs.

The finding also highlights the effectiveness of seeking help from family members, sharing household responsibilities, and seeking financial support from friends, families, and support groups. These strategies align with the concept of social support, which has been consistently identified as a crucial coping resource for parents of children with special needs (Ekas et al., 2010). Social support can provide emotional, instrumental, and informational assistance, buffering the negative impacts of stress and improving overall well-being.

The findings revealed that the strategies adopted by parents in managing their children behavior are very effective. It agrees with the study of (Al-Kandari et al., 2017) and (Alnemary et al., 2017) which stated that coping strategies are crucial for parents of children with autism because of the challenging behavioural problems that the disorder presents

and it can have a significant impact on the quality of life for the parent as well as the child. Coping strategies can turn what was originally a very difficult process, which is the child-rearing process, into an enjoyable experience for all the family.

The findings further revealed the perceived influence of parents coping strategies on the academic and social outcomes of their children with special needs. Effective communication with the child can foster positive social interactions and friendships. Open and patient communication can help children with special needs develop social skills, express their needs, and form meaningful connections with peers. Implementing appropriate strategies can improve academic performance and promote independence. Tailored educational approaches, such as individualized instruction, assistive technologies, and positive reinforcement, can enhance learning outcomes and foster self-reliance in children with special needs. Engaging in self-care activities can positively impact a child's social interactions and play. When parents prioritize their own well-being through self-care practices, they may have more patience, energy, and emotional resources to support their child's social development and encourage interaction with peers. Collaboration with school staff can improve the child's overall quality of life. This is also supported with the study of Zeitlin and Curcic (2014) which posited that effective communication and cooperation

between parents and school professionals can ensure that the child's needs are adequately addressed, leading to better educational and developmental outcomes.

Effective communication and engagement between parents and their children can foster stronger relationships, enhance social skills, and create a supportive environment for learning and personal growth. Training the children in self-care activities was also found to make the children more independent and resilient and have enabled them to play with other children. This finding is consistent with the benefits of promoting self-care skills in children with special needs. Pelentsov et al. (2015) highlighted that developing self-care abilities can foster independence, autonomy, and overall well-being, which can positively impact the child's social interactions and participation in various activities. These findings imply that by adopting effective coping strategies, such as open communication, promoting self-care skills, and collaborating with educational professionals, parents can positively influence the academic and social outcomes of their children with special needs. These strategies not only help manage the challenges faced by families but also contribute to the overall development and well-being of the children. Epstein (2019) corroborated this observation and said that since parents know the capabilities of their children, they,

therefore, attend activities primarily to assist their kids physically and provide proper care.

Furthermore, findings from research also revealed that the parents of special needs children were satisfied with the level of support received from school staff and the community. These include the support received from the staff, the availability of special resources for training the children, the level of advocacy, and other training programs within the state. They also benefit from the advice from other parents of children with similar disability. The respondents' satisfaction with state advocacy organizations and training programs focused on special needs children suggests the availability of valuable resources and support systems within the community. Some states or communities offer training programs specifically designed for parents of children with special needs. These programs can help parents develop skills and strategies for managing their child's specific condition, fostering their development, and advocating for their rights (Hume et al., 2021). Seeking and obtaining advice from other parents with similar challenges highlights the importance of a collaborative and supportive ecosystem involving educational institutions, community organizations, and peer networks for families of children with special needs. It also underscores the need for continued investment and improvement in these support systems to ensure that families receive the necessary resources,

guidance, and encouragement throughout their caregiving journey.

Conclusion

Parents of children with special needs in Kwara state face numerous challenges, including emotional stress, financial strain, and increased demands for parental support and attention. These challenges can persist throughout their lives, making it crucial for parents to develop effective coping strategies. The coping strategies adopted by parents in this study include seeking help from healthcare providers, financial support from friends and families, engaging in support groups, relying on faith and prayer, and practicing self-care activities. These strategies have proven to be effective in managing their children's behavior and needs, aligning with previous research highlighting the importance of adopting adequate coping strategies for parents of children with special needs. These strategies positively influenced the academic and social outcomes of their children. By providing extra attention, time, and care, parents play a vital role in their children's education and overall development. This finding emphasizes the significance of parental involvement and the effectiveness of coping strategies in enhancing the well-being and progress of children with special needs. Furthermore, the study revealed that parents are generally satisfied with the level of support received from staff, the special resources and services utilized by the school, and the advice and guidance

provided by other parents of children with similar disabilities. This satisfaction with available support systems and resources is crucial for helping parents cope effectively and providing the best possible care and assistance for their children.

Recommendations

Based on the findings of this study, the following recommendations were made.

1. The government should provide funding to local community centers to create and maintain support groups for parents of children with special needs.
2. The government should create a tax credit or other financial incentive for families with children with special needs.
3. Parents should advocate for the needs of children with special needs.

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Emotional Intelligence of Early Adolescent Students in Obio-Akpor Local Government Area, Rivers State: The Predicting Roles of Self-Efficacy and Locus of Control

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Abstract

The study assessed how the emotional intelligence of early adolescents in Obio-Akpor local government area, Rivers State is predicted by their self-efficacy and locus of control. Data from 395 out of 29,058 respondents were obtained using descriptive and correlational survey design following multi-stage sampling techniques. Four research questions and 3 null hypotheses guided the study. A structured questionnaire, emotional intelligence scale, Levenson's multidimensional Locus of Control Scale, and General Self-Efficacy Scale were instruments used for data collection. Cronbach alpha reliability index was used to calculate the reliability of the instruments and scores of 0.83, 0.89 and 0.83 were obtained respectively. The obtained data were analyzed in IBM SPSS version 23 using descriptive and inferential statistics at $p < 0.05$. The findings revealed that emotional intelligence and locus of control levels among adolescents were low respectively. A high self-efficacy status was however recorded among the respondents. Locus of control and self-efficacy predicted emotional intelligence by 35%. Being a male or a female was associated with emotional intelligence and self-efficacy in adolescents. In addition, being a border or day student was associated with the adolescents' emotional intelligence, locus of control, and self-efficacy. Emotional intelligence, locus of control, and self-efficacy differed based on the type of school the adolescents attend. Based on the findings, it was recommended that education programs targeted at enhancing the ability of adolescents to recognize and differentiate feelings should be organized by schools and governmental and non-governmental organizations.

Keywords: Emotional intelligence, Locus of control, Self-efficacy, Adolescents, Students, River State

Introduction

Adolescence is the developmental stage between childhood and

adulthood, between 10 and 19 years of age (World Health Organization WHO, 2022). According to WHO

(2022), adolescence is the developmental stage that occurs between the ages of 10 and 19 and occurs between childhood and adulthood. It is here that the personality and social adjustment of the self emerge (Soriano-Sánchez & Sastre-Riba, 2022). Adolescence is characterized by a shift in the focus of the social worlds of the adolescents, so that they spend more time with, and gain much more emotional support from peers rather than family members. The focus of adolescents' social environments shifts during adolescence, and they begin to receive more emotional support and spend more time with their peers rather than their family members.

The social worlds of adolescents change during adolescence, with a greater emphasis on peers than on family members. Peers become significant sources of emotional support and companionship. This may be attributed to their educational level. Most of the adolescents are seen in secondary schools. This is because secondary education is intended for those within the ages of 11 and 17 years. It serves as a connection between primary and tertiary education and thus, seen as a crucial part of a child's education. Some of these students are in boarding schools while some are day students who attend classes from home. Boarding and day schools are two categories of educational institutions that provide students with unique experiences. Students in boarding schools known as boarders live in the accommodation

provided by the school in the premises, for the whole academic year. Day students on the other hand come from their homes to school. This study made use of secondary school students. This is because secondary schools make it possible to get a number of adolescents due to the high population of students in several schools. This therefore, offers a representative sample for this age group.

Generally, adolescents are able to explore a variety of new found freedoms, including many activities away from adult supervision. Adolescence has therefore been seen to be a very vulnerable age as the individual has to deal with the changing environment in social, emotional as well as physical areas. According to Zhao et al. (2019), the adolescent stage is characterised by the formation of the self-identity, personality configuration, and relational network. The adolescents exhibit extreme emotional instability throughout this stage, mainly in the closest settings, such as home and school, withdrawing inside themselves without stopping to express their feelings, making it difficult for him/her to adapt to new social responsibilities. This is because they encounter new experiences; unfamiliar situations often result in new and possibly intense positive and negative emotional reactions (Karibeeran & Shefali, 2019). It is, therefore, a sensitive period in the development of mental disorders (Sharp & Wall, 2017).

Emotional Intelligence during adolescence is therefore crucial not only in avoiding problems in the adolescent himself but also for his future development (Huebner et al., 2013). Emotional intelligence develops somewhat in early adolescence. Salovey and Mayer in Davis and Humphrey (2014) defines emotional intelligence as a form of intelligence "that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thoughts and actions. According to Sorian et al. (2019), emotional intelligence (EI) is a psychological construct that is an individual competence. It refers to a person's ability to perceive, comprehend, and control their own emotions in order to correctly interpret those of others (González-Yubero et al., 2021). As Tejada-Gallardo et al. (2022) point out, it actually enables a constructive reaction to the various issues arising from one's own emotions or sensations in various social contexts, providing the individual with the chance to improve their situational awareness (Usán et al., 2020). In order to make decisions under pressure, avoid anxious or depressive states, and have a better understanding of one's own emotions and self-confidence, one needs to have emotional intelligence (EI), which is defined as the capacity that enables the "self" to manage, understand, select, and control its emotions as well as those of others (Azilah et al., 2020). In this study, emotional intelligence was

operationalized as the ability of an individual to manage his/her emotions and that of others in order to influence interaction with others

Self-efficacy is a protective element associated with mental health and psychological diseases that is essential to the cognitive appraisal process of stresses or difficulties (Bandura et al., 1999; Sandin et al., 2015; Schönfeld et al., 2016). Adolescents' developing sense of self-efficacy is a result of the reciprocal interactions between intrapersonal elements (behavioural, affective, and cognitive capacities) and external circumstances; as a result, self-efficacy shapes personal behavioural patterns and is influenced by the conditions of the environment. Self-efficacy is described as a positive or salutogenic psychological factor – one that potentially protects or buffers against negative psychological influences (Mikkelsen, 2020). A person who has strong self-efficacy feels competent to complete a task and receive feedback. If self-efficacy is low, the individual may not perform though he or she has the abilities. Self-efficacy, according to Cicognani (2011), improved psychological well-being and allowed the teenagers to handle little stressful situations. Studies have shown that high self-efficacy beliefs have positive effects on self-regulation strategies and on academic performance in educational settings (Huang, 2013, Putwain et al., 2013, Schunk and Meece, 2005).

The control that early adolescents attribute to themselves over a situation/external (locus of control)

and the control they attribute to themselves (self-control/internal) have been proposed as aspects that can have an effect on internalizing problems in young people. Locus of control deals with students' personal belief that others control the consequences of their action. Students with an internal locus of control believe that they have direct control over the outcomes of their actions (Guijar & Ajaz, 2014). According to Joo et al. (2013), locus of control is a person's understanding of the fundamental reasons behind life's events. According to Mayer and Salovey (1997) locus of control is developed on a continuum, ranging from internal to external. Students at the internal end of this continuum are said to have a high locus of control while those at the external end refers to those with low locus of control. Perkins (2008) provided evidence in favour of the theory that individuals who possess an internal locus of control are less vulnerable to social influence.

The development of emotional intelligence, self-efficacy, and locus of control can be influenced by gender roles and societal expectations. Men are usually encouraged to value reason, while women are urged to improve their emotional intelligence. While women may be driven to be more careful and nurturing, men are frequently encouraged to take risks and express themselves. Traditional gender roles also promote men's independence and self-reliance while socializing women to be more nurturing and interdependent in terms

of locus of control. These support a number of studies that indicate that girls tend to be more emotionally intelligent than boys (Patel, 2017). Significant disparities were discovered by Mishra & Ranjan (2008), who reported that adolescent males had greater emotional intelligence scores than girls. On the other hand, Mokhlesi & Patil (2018) refute these assertions, stating that adolescents of both genders demonstrate comparable levels of emotional intelligence. Adolescents' self-efficacy has also been observed to vary by gender. Nonetheless, a large number of research on the variations in teenage self-efficacy by gender comes from outside the nation. Hence, further research in these areas within the study region is necessary, given the contradictory gender perspectives on emotional intelligence, self-efficacy, and locus of control in other studies and other nations. In addition, emotional intelligence has been negatively associated with stress, depression, and negative emotions. These are all elements that can lead to the generation of maladaptive behaviors (Trigeros et al., 2019). These maladaptive behaviours consequently impact the mental health of an individual. It has been reported that locus of control is related to mental health (Groth et al., 2019; Kesavayuth et al., 2019) and may be able to predict the likelihood of suicide (Loftis et al., 2019), and discipline problems (Kee, 2003). Little is known about the emotional intelligence, locus of control and self-efficacy of adolescents in

developing countries such as Nigeria. This is the gap this study aims to fill focusing on the adolescents in Obio-Akpor local government area of Rivers State.

Objectives of the Study

The broad objective of the study was to examine the predicting role of locus of control and self-efficacy on the emotional intelligence of early adolescents. Specifically, the study sought to:

1. assess the respondents' locus of control level
2. ascertain the level of self-efficacy among the respondents.
3. determine the emotional intelligence status of the respondents.
4. determine the role of locus of control and self-efficacy in predicting the emotional intelligence of the respondents

Hypotheses of the Study

The following hypotheses guided the study

1. **H₀₁**: there is no significant difference in the mean scores of the respondents on emotional intelligence, locus of control and self-efficacy based on gender.
2. **H₀₂**: there is no significant difference in the mean scores of the respondents on emotional intelligence, locus of control and self-efficacy based on type of student.
3. **H₀₃**: there is no significant difference in the mean scores of the respondents on emotional intelligence, locus of control and

self-efficacy based on type of school.

Methodology

Study Design: The study adopted a descriptive and correlational survey research design. The descriptive design was used to examine the current situation in a given place and to check the extent to which current practices meet the required standard (Uzoagulu, 2008). The correlational design was used to determine the relationships among variables. Aihie (2018) used it in his study on self-efficacy and emotional intelligence among Nigerian adolescents in single-sex and co-educational secondary schools. Therefore, the design was considered fit for this study.

Study Population: The study population consisted of all the early adolescent (10-13 years) students in Obio Akpor local government area of Rivers State. Adolescents in junior secondary schools were used. This comprises a total population of 29,058 adolescents (Universal Basic Education Commission Rivers State, 2022).

Sampling Technique/Sample Size Determination: The study employed a multi-stage sampling technique which included the following stages:

Stage one: This involved cluster sampling of the schools into private and public clusters.

Stage two: Simple random sampling by balloting without replacement was used to select 10% of schools in each cluster. This gave a total of seven schools from private cluster, and 3 schools from public cluster. This gave a total of 10 secondary schools.

Stage three: The sample size for the study was calculated using the formula by Yamane (1967) below:

$$n = \frac{N}{1 + N(e)^2}$$

Where N = total population under study
(early adolescents in junior secondary schools in Obio-Akpor L.G.A)

n= sample size

e= margin error (0.05)

$$n = \frac{29058}{1 + 29058(0.05)^2}$$

$$= \frac{29058}{73.645}$$

n= 394.56 395 respondents

The sample size was further increased by 5% to account for non-response or recording error.

$$5\% \text{ of } 395 = 19.8 \approx 20$$

Sample size = 395 + 20 = 415 respondents

Stage four: Proportionate sampling was used to determine the number of adolescents in each of the selected schools that was used for the study. This was done by proportionately distributing the sample size in each of the selected schools.

Final Stage: All the students present on the day of the visit were given a questionnaire to fill out

Informed Consent: The school heads and the teachers were informed about the study and their approval was obtained. A written consent was also obtained from the respondents that were part of the study, after explaining to them the study protocol. Students who gave their consent were recruited for the study. Confidentiality of all the information collected was assured.

Instrument for data collection: three standardized instruments were used for data collection. They include Levenson's Locus of Control Scale, the General Self-Efficacy Scale and the Emotional Intelligence Scale.

The respondents' Locus of Control was assessed using Levenson's (1973) Internal, Powerful Others, and Chance (IPC) locus of control Scale. This assessed the multiple dimensions within the internal and external sides (powerful others and chance) of the Locus of Control continuum using 24 items. The IPC scale distinguishes between three factors: Internality, Powerful Others, and Chance. The items were scored using a 6-point Likert scale which ranged from Strongly Disagree (-3) to Strongly Agree (+3). Some of the items include: "To a great extent my life is controlled by accident happenings" (Item 2), "I have often found that what is going to happen will happen" (Item 10). High ratings on either the Powerful Others scale or the Chance scale indicate a strong external locus of control. An individual could score high or low on all three dimensions. Higher scores on the Internal Locus of Control scale indicates that one has a strong internal locus of control. An internal locus of control can be helpful for successful behavior change. High ratings on either the Powerful Others scale or the Chance scale indicate a strong external locus of control. If one rates high on the Powerful Others scale, the person typically believe that their fate is controlled by external forces such as

government, authority figures, groups etc.

The General Self-Efficacy Scale (ASES) developed by Schwarzer and Jerusalem (1995) was used to assess students' self-efficacy. The scale is a 10-item scale that assesses self-efficacy based on personality disposition. The items were measured on a 4-point Likert scaling model with options ranging from 1= Not at all true, to 4 = Exactly true. Some of the items include: "I can always manage to solve difficult problems if I try hard enough" (Item 1), and "I can remain calm when facing added difficulties because I can rely on my coping abilities" (Item 7).

The 33-item Emotional Intelligence Scale (EIS) by Schutte, et al. (1998) was used to elicit information on the emotional intelligence of the respondents. It includes statements that appraise the expression of emotions in self and others, emotional perception, regulating of self and others as well as emotional utilization. The participants rated the extent to which they agreed or disagreed with each statement on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Validation and Reliability of the Instrument: The various questionnaires were pilot-tested among 20 students in a secondary school in Rumuola. Cronbach alpha reliability scores of 0.83, 0.89, and 0.82 were obtained for the emotional intelligence scale, locus of control scale, and general self-efficacy scale respectively.

Method of Data Collection: Four hundred copies of the questionnaires were printed and hand-distributed to the adolescents in their classrooms by the researcher and the trained assistants. The respondents were given sufficient time to fill out the questionnaires. The questionnaires were collected same day to increase the chances of return. All (100%) the distributed copies of the questionnaire were retrieved.

Data and Statistical Analysis: The data from the questionnaire was coded and input into the Statistical Product for Service Solution (IBM-SPSS) version 23.0. Descriptive results were presented in frequencies, percentages, means, and standard deviations. Student's T-test was used to determine the difference among variables. Linear regression was used to determine the role of emotional intelligence and locus of control on the self-efficacy of the adolescents. The significance level was accepted at $P \leq 0.05$. For the emotional intelligence scale, the total score was calculated by finding the sum of the points for all the items and ranged from 33 to 165. Higher total scores indicated high emotional intelligence while lower total scores indicated low emotional intelligence (Schutte et al., 1998). The mean EI score is 124; scores below 111 or above 137 are considered unusually low or high (Malouf, 2014). For this study, scores from 33 – 99 were considered low whereas scores from 100 – 165 were considered high. For the general self-efficacy scale, total score was calculated by finding the sum of the

items. The total score ranges between 10 and 40, with a higher score indicating higher self-efficacy. Scores from 10 to 24 were considered low while scores within 25 and 40 were considered high. For the locus of control, the total score was obtained for each factor. The score for the total LOC ranged between 28 and 144. Scores ranging from 28 to 84 were categorized as low LOC while scores from 85 to 144 were categorized as high LOC. For each category, the scores ranged between 0 and 48 with a high rating indicating a strong locus of control. Scores between 8 to 28 were categorized as low for each category while scores between 29 to 48 were categorized as high.

Results

Table 1 shows the level of locus control of the respondents. From the Table, a greater percentage (50.7%) of the respondents had a low internal locus of control while 49.3% had a high internal locus of control. More than half (69.5%) had a low locus of control powerful others and 30.5% had a high locus of control powerful others. The majority (58%) had a low locus of control chance while 42% had a high locus of control chance. This implies that the respondents had both low internal control and low external control (which comprised of powerful others and chance).

Table 1: Level of Locus of Control of the respondents

Variables	Frequency	Percentage (%)
Internal Locus of Control		
Low Internal Locus of Control	203	50.7
High Internal Locus of Control	197	49.3
External Locus of Control		
Powerful Others		
Low Locus of Control Powerful Others	278	69.5
High Locus of Control Powerful Others	122	30.5
Chance		
Low Locus of Control Chance	232	58.0
High Locus of Control Chance	168	42.0

Table 2 shows the level of self-efficacy of the respondents. From the table, a higher percentage (58.8%) had high self-efficacy while a lower percentage (40.8%) had low self-efficacy. Based on the categories of self-efficacy, the majority (66.5%) had high emotional appraisal while a few (33.5%) had low emotional appraisal. About 59% had high emotional control while 41.5%

had low emotional control. In the aspect of the negative outlook, more than half (53.8%) had a high negative outlook while 46.3% had a low negative outlook. A high percentage (69.5%) had high emotional utilization while the rest (28.2%) had low score. About 60% showed high optimism and only 26.8% showed low optimism. A greater percentage (68.3%) had high

social skills while the least (20.8%), had low social skills. More than half (70.8%) had high emotional regulation while 19.3% had low emotional regulation. More than half (69.3%) had high emotional awareness while 21.0% had low emotional awareness. High (56.0%) non-verbal interpretation was seen among the respondents and a little (30.3%) among the rest.

Table 2: Level of Self-Efficacy of the Respondents

Variables	<i>f</i>	%
Emotional Appraisal		
Low Emotional Appraisal	134	33.5
High Emotional Appraisal	266	66.5
Emotional Control		
Low Emotional Control	166	41.5
High Emotional Control	234	58.5
Negative Outlook		
Low Negative Outlook	185	46.3
High Negative Outlook	215	53.8
Emotional Utilization		
Low Emotional Utilization	113	28.2
High Emotional Utilization	278	69.5
Optimism		

Low Optimism	107	26.8
High Optimism	239	59.8
Social Skills		
Low Social Skills	83	20.8
High Social Skills	273	68.3
Emotional Regulation		
Low Emotional Regulation	77	19.3
High Emotional Regulation	283	70.8
Emotional Awareness		
Low Emotional Awareness	84	21.0
High Emotional Awareness	277	69.3
Non-Verbal Interpretation		
Low Non-Verbal Interpretation	121	30.3
High Non-Verbal Interpretation	224	56.0
Self-Efficacy		
Low Self-Efficacy	163	40.8
High Self-Efficacy	235	58.8

Figure 1 shows the level of emotional intelligence of the respondents. From the data, half (50.1%) of them showed low emotional intelligence while 49.9% of them had high emotional intelligence.

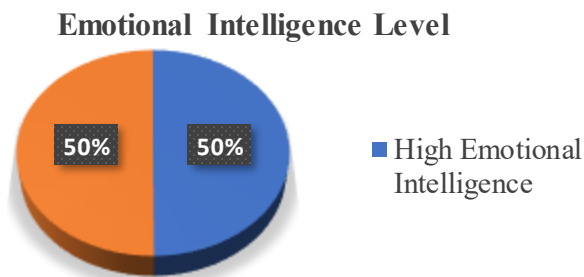


Figure 1: The level of emotional intelligence of the respondents

Table 3 shows how emotional intelligence is predicted by locus of control and self-efficacy of adolescents. Overall, the regression was significant, $F(2, 397) = 107.75$, $p < 0.5$, $R = .35$. Both locus of control ($B = .46$, $t(2) = 8.20$, $p < .05$) and Self efficacy ($B = .17$, t

(397) = $p < 0.5$) were significant. The study showed a large effect size $R^2 = .35$. this indicates that locus of control and self-efficacy accounted for 35% of the variance in the respondents emotional intelligence scores.

Table 3: Multiple Regression Analysis of emotional intelligence, locus of control and self-efficacy of the adolescents

Variable	Coefficient	Std. Error	t-Statistic	Sig.
Constant	24.334	5.799	4.196	0.000
Locus of control	0.416	0.051	8.194	0.000
Self-efficacy	0.486	0.162	3.003	0.003
R-squared	0.352	F-statistic	107.745	
Adjusted R-squared	0.349	Sum squared	96830.531	
Std. Error of estimate	15.617	residual		

Hypothesis 1: There are no significant differences in the mean scores of the male and female students on emotional intelligence, locus of control and self-efficacy

Table 4 revealed that the mean emotional intelligence score of the female (103.24 ± 20.12) was significantly different from those of the male (99.14 ± 17.99), $p < 0.05$. The self-efficacy of the male students (25.74 ± 6.21) was significantly different from those of the females (27.06 ± 7.07), $p < 0.05$. However, the mean locus of control score of the

males (80.37 ± 20.84) was not significantly different from those of the females (84.45 ± 21.88), $p > 0.05$. Furthermore, the males had higher emotional intelligence and self-efficacy than the females. This indicates that the null hypothesis is upheld for emotional intelligence and self-efficacy but rejected for Locus of control. It can therefore be inferred that the emotional intelligence and self-efficacy of the early adolescents varied by gender.

Table 4: Mean difference in emotional intelligence, locus of control, and self-efficacy based on gender

Variables	Gender	F	Mean	Standard Deviation	t-value	p-value	df
Emotional Intelligence	Male	167	99.14	17.99	-2.094	0.037	398
	Female	233	103.24	20.12			
Locus of Control	Male	167	80.37	20.84	-1.87	0.06	398
	Female	233	84.45	21.88			
Self-Efficacy	Male	167	25.74	6.21	-1.92	0.05	398
	Female	233	27.06	7.07			

Hypothesis 2: There are no significant differences in the mean emotional intelligence, locus of control and self-efficacy scores of the students in day and boarding schools.

Table 5 revealed that the mean emotional intelligence score of the Day students (103.80 ± 18.99) was significantly different from those of the boarders (87.29 ± 15.14), $p > 0.05$. The mean locus of control score of the day students (84.62 ± 21.37) varied from those of the boarders (71.00 ± 18.70)

$p > 0.05$. Furthermore, the self-efficacy of the Day students (27.12 ± 6.68) was significantly different from those of the boarders (22.65 ± 5.86) $p > 0.05$. The boarder students had higher emotional intelligence, locus of control and self-efficacy than the day students. This indicates that the null hypothesis was rejected. It can therefore be inferred that the emotional intelligence, locus of control and self-efficacy of the respondents varies by the type of student.

Table 5: Mean difference in the emotional intelligence, locus of control and self-efficacy based on the type of students

Variables	Type of student	F	Mean	Standard Deviation	t-value	p-value	df
Emotional Intelligence	Day student	345	103.80	18.99	6.14	0.00	398
	Boarder	55	87.29	15.14			
Locus of Control	Day student	345	84.62	21.37	4.46	0.00	398
	Boarder	55	71.00	18.70			
Self-Efficacy	Day student	345	27.12	6.68	4.68	0.00	398
	Boarder	55	22.65	5.86			

Hypothesis 3: There are no significant differences in the mean scores of the students in public and private schools on emotional intelligence, locus of control and self-efficacy.

Table 7 revealed that the mean emotional intelligence score of those in

public schools (92.18 ± 18.06) was significantly different from those in Private (102.51 ± 19.24) $p > 0.05$. The mean locus of control score of the public schools (74.26 ± 24.38) varied from those in Private (83.64 ± 21.04), $p > 0.05$. Similarly, the self-efficacy of

those in public (24.00±7.21) was significantly different from those in private (26.77±6.65), $p>0.05$. The public schools had more emotional intelligence, locus of control and self-efficacy than the private schools. The implication is that the null hypothesis

was rejected. This leads to the conclusion that the type of school influences the emotional intelligence, locus of control and self-efficacy, experienced by the early adolescent in Obio-Akpor in Port Harcourt, River State.

Table 7: Mean difference in the emotional intelligence, locus of control and self-efficacy based on type of school

Variables	Type of school	F	Mean	Standard Deviation	t-value	p-value	df
Emotional Intelligence	Public	38	92.18	18.06	3.33	0.02	46.27
	Private	362	102.51	19.24			
Locus of Control	Public	38	74.26	24.38	2.28	0.02	42.98
	Private	362	83.64	21.04			
Self-Efficacy	Public	38	24.00	7.21	2.27	0.02	43.87
	Private	362	26.77	6.65			

Discussion

The study examined the predicting role of locus of control and self-efficacy on the emotional intelligence of early adolescents. The findings of this study revealed an even distribution of high and low emotional intelligence among the respondents. This implies that as much proportion of the adolescents in the study area had the potential to master and regulate their emotions as those who did not. The 50% prevalence of low emotional intelligence observed in this study is lower than the 78% found by Aniemeka et al. (2020) among adolescents in Ogun state Nigeria. Emotional intelligence is a skill that can be learned and developed over time. It could be acquired in schools or the living environment. Adolescents are often exposed to various social vices and negative experiences during interaction with

their peers and the society in which they live. Some researchers opined that adolescents born in this millennium have grown up seeing crises and terror acts that impact their emotions (Ugoani, 2015; Ugoani&Ewuzie, 2013). How they process these negative experiences might influence their level of emotional intelligence. Ejikeme (2012) also believes that the incessant religious, ethnic, and political conflicts in Nigeria reflect the poor emotional intelligence evident among young people.

The study highlighted the various categories of locus of control of the respondents. From the findings, a greater percentage had low internal locus of control as well as low external locus of control. This is evident as more than half reported low locus of control powerful others and low locus of control chance. This implies that the

respondents neither believed that the consequences of their action on their life is controlled by themselves (internal) nor by external factors (such as powerful others or chance). That is to say that they typically do not try to master their environment nor feel helpless because they perceive that outcomes in life are outside their own control. This suggests that they may have been some confounding factors such as self-esteem and mental health, which may have influenced the result. These have been shown to influence locus of control (Alizadeh et al., 2005).

Favourable view of oneself and one's abilities as an internal asset appears also to be valuable in helping young adolescent to avoid emotional difficulties (Baudura, 2011; Buhrmester, 2012). From the findings of the study, higher percentage had high level of self-efficacy. Based on the categories of self-efficacy, majority had high emotional appraisal, emotional control, negative outlook, emotional utilization, optimism, social skills, emotional regulation, emotional awareness and high non-verbal interpretation. The study revealed that locus of control and self-efficacy were significant predictors of emotional intelligence. This is not surprising because self-efficacy is a protective factor that is integral to the process of cognitive appraisal of stressors or challenges (Sandin et al., 2015; Schönfeld et al., 2016). Furthermore, with high self-efficacy one feels confident to perform particular task and get reinforcement. The activities people choose to engage in, the

amount of effort they put forth, their persistence in the face of adversity, and the complexity of the goals they set are all influenced by their self-efficacy.

The result of this study revealed that the mean emotional intelligence and self-efficacy scores of the respondents were significantly different and varied based on gender. The difference in the mean emotional intelligence and self-efficacy score of the respondents based on gender showed that males had more emotional intelligence and self-efficacy than the females. This is in line with the findings of Fallan and Opstad (2016) who revealed that female students have significantly lower self-efficacy than their male peers. Moreso, a study by Cespedes et al. (2020) revealed that males had higher self-efficacy than the females. A study by Kumar and Dullet (2022) which revealed that female adolescents have higher emotional intelligence than males, however, contradicts the findings of this study. This finding may be explained by the fact that both the male and female adolescents both experience the crises and terror acts prevalent in the country which have been linked to poor emotional intelligence. This study also revealed that the locus of control score of the respondents did not differ by gender. This supports the study by Chinedu and Nwizuzu, (2021), study which found both sexes equal in their locus of control. The findings of this present study contradict the result of a study conducted by Fatemi, & Hoseiniyan

(2016), which showed that locus of control was more internalized in male students than in female students.

The result of this study revealed that the mean emotional intelligence score, locus of control score and self-efficacy score of the respondents varied based on the type of student. The difference in the mean emotional intelligence, locus of control and self-efficacy score of the respondents based on the type of student showed that the boarder students had more emotional intelligence, locus of control and self-efficacy than the day students. This could be as a result of the training (such as hostel disciplinary measures which is applicable to only boarder students) given to the boarder students in school which the day students do not get. Boarding life promotes the development of students' self-awareness and increases their independence and self-discipline (Ma, 2012). The boarding environment increases the density of interactions between students, which tends to produce the contagion of negative emotions among peers (Li and Lin, 2019). According to Niknami et al. (2011) and Mander et al. (2014), it typically presents as interpersonal hypersensitivity combined with depression, anxiety, paranoia, and other negative feelings and psychiatric issues.

The result of this study revealed that the mean emotional intelligence score, locus of control score and self-efficacy score of the respondents were significantly different and also varied based on the type of school. The

difference in the mean emotional intelligence, locus of control and self-efficacy score of the respondents based on the type of school showed that the private schools had more emotional intelligence, locus of control and self-efficacy than the public schools. This result is not out of place as most private schools create conducive environment and provide the right resources needed for students to develop their emotional and social skills. More so, the private schools have the ability to provide individualized learning and support due to their better student-teacher ratio compared to public schools. This is supported by a study conducted by Alam (2018) who found that there is a significant difference between private and government school students on emotional intelligence, with private school students scoring higher. Furthermore, the finding is in line with the investigations carried out by Rani (2019); Nadeem & Nowsheen (2013); Bhat & Khan (2013); Khan and Ishfaq (2013) and Sing (2010) which revealed that there is a significant difference of emotional intelligence among adolescents with reference to socio-economic status and type of school (private/government). Those are private schools had better emotional intelligence than those in government school. Present finding, however, contradicted a study by Chinedu and Nwizuzu, (2021), which showed that locus of control is about the individual and not the school-type. Furthermore, it contradicts the finding of Fallan and Opstad (2016) who found a significant

relationship in the self-efficacy of government and private students.

Conclusion

The respondents experienced low level of emotional intelligence, and locus of control. However, their self-efficacy was high. Locus of control and self-efficacy were significant predictors of emotional intelligence. Thus, locus of control and self-efficacy are good predictors of emotional intelligence among adolescent population. Emotional intelligence, locus of control, and self-efficacy scores of the female, day, and private school early adolescent students were higher than that of the male, boarder, and public early adolescent. This implies that there is gender variation as well as variations based on type of school and type of student, in the emotional intelligence, locus of control, and self-efficacy of adolescents.

Recommendations

The following recommendations were made based on the findings of the study:

1. Government and schools should provide valuable information for the design, implementation, and evaluation of programs for the development of Emotional intelligence, and for the promotion, prevention, and intervention of emotional problems in adolescence.
2. Post-primary school service commission should train, and initiate education programs related to locus of control for school guidance counsellors to acquire

more skills and be empowered to solve the problems of low locus of control among male and female adolescents and also help strengthen their locus of control thereby enhancing their psychological well-being.

3. The Ministry of Education should support functional guidance and counseling services by providing and making funds available to research and improve rendering professional assistance to early adolescents with low locus of control.

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Prevalence of depression among male retirees in University of Nigeria, Nsukka: Relationship of income and age

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Abstract

Depression is the most common and serious medical illness that negatively affects people's feelings, thoughts, and actions, and retired civil servants are not left out in this scourge. This study investigated the relationship between income and age on depression among retired male civil servants in a university community in Nigeria. Three specific objectives guided the study. A correlational research design was adopted for the study. The population of the study comprised 5000 retired staff members of the University of Nigeria Nsukka. A random sampling method was used to select 350 retired staff. The instrument for data collection for the study was the Geriatric Depression Scale (GDS-15) which showed acceptable Cronbach's alpha internal consistency (0.752). Frequencies and percentages were used to answer the research questions while Chi-Square (χ^2) statistics at 0.05 level of significance were used to test the null hypotheses. Findings revealed that many (43.4%) of retired civil servants experienced depression. The income level of respondents was significantly associated with depression ($\chi^2 = 6.760$, $df = 2$, $p = 0.034$). Retired civil servants who earned less than ₦50,000 experienced a moderate proportion (65.3%) of depression and retired civil servants who earned between ₦50,000-100,000 and above ₦100,000 experienced a moderate proportion (50.7%) and (51.2%) of depression respectively. The age of the respondents was not associated with depression ($\chi^2 = 3.765$, $df = 2$, $p = 0.152$). The study concluded that the prevalence of depression among retired civil servants was high. A recommendation was made for the government to be paying the gratuity and subsequent pension of the retired civil servants as at when due to check and avoid depression after service.

Keywords: Depression, Monthly Income, Age Retirement, Civil servants

Introduction

Depression is a common and serious medical illness that negatively affects feelings, thoughts and actions affecting

people of diverse age group. Retired civil servants are not left out in this scourge of depression. According to the World Health Organization,

between 2015 and 2050, the number is expected to increase from 900 million to 2 billion people aged 60 and above (WHO, 2017). According to the World Health Organization [WHO] (2017), between 2015 to 2050, the number of people aged 60 and above is expected to increase from 900 million to 2 billion. Globally, the total number of people with depression was estimated to exceed 300 million in the year 2015 and the prevalence rate of depression among males aged 55-74 years is 5.5% (WHO, 2017)

Zenebe et al. (2021) reported that the pooled prevalence of depression among the aged in developing countries was 40.78% compared to 17.05% in developed countries. Mental conditions such as depression in older adults account for 6.6 per cent of the total disability and nearly 15 per cent of adults aged 60 and above suffer from a mental health problem mainly depression (WHO, 2015). From the foregoing, depression appears to affect the elderly group more as a result of the feeling of being constrained by some adverse situations surrounding retirement in the country. Depression appears to affect the elderly group more as a result of the feeling of being constrained by some adverse situations surrounding retirement in the country such as inconsistencies in payment of meagre pension. Depression was found to be a widespread mental health problem among elderly community dwellers in 22 states of Nigeria with a prevalence of between 19.8 per cent and 26.2 per

cent (Central Statistics Agency [CSA], 2018).

Depression is a mood disorder which affects feeling, thoughts and actions negatively with lack of interest or pleasure in activities and energy loss that lasts for two weeks or more (WHO, 2019). Zenger (2011) and WHO (2019), defined depression as a mood disorder which negatively affects feelings, thoughts and actions with a lack of interest or pleasure in activities and energy loss that lasts for two weeks or more. Guo et al. (2016) described depression as a common response to health problems which appears to be an under-diagnosed problem in the elderly population. European Alliance against Depression (2017) opined that depression results from a complex interaction of social, psychological and biological factors. People who have gone through adverse life events such as psychological trauma are more likely to develop depression. Depression is a major emotional health problem that is frequently undetected and untreated but has the potential of resulting to impaired quality of life among the elderly (Manaf et al., 2016; Mental Health Foundation, 2015). There is evidence that some natural body changes associated with aging may increase the risk of experiencing mental health problem such as anger and depression (American Psychological Association, 2016) especially among the retired population.

Retirement can be seen as a transition from one status of life to

another. It is a highly valued feat and retired civil servants in the parlance of the area of study are referred to as senior citizens (those who have completed their stipulated years of government service). Pillah (2023) averred that retirement is the act of completion of regular work because of attaining a specified number of years. The years of retirement are streamlined in Sections 4(a) and (b) of the University Miscellaneous Provisions Amendments Act (UMPAA) of 2012 that the compulsory retirement age for academic staff in the professorial cadre and non-academic staff shall be 70 years and 65 years respectively (National Pension Commission, 2017). Therefore, every civil servant that is employed in any university in the country is required to serve effectively either as a non-academic or academic till the completion of 65 or 70 years.

Civil servants are known to be generally categorized into federal, state, and local government workers. They are seen and referred to as government paid workers and are meant to receive their salaries monthly and consistently. However, it is disheartening that the reverse is the case with most civil servants both active and retired civil servants, as they are owed their salaries and are not being paid as at when due, resulting in mental health problems like depression (Elufidipe-Olumide, 2018). Retirement is an important moment that is accompanied by several issues to which individuals need to carefully adjust (Wetzel &

Huxhold, 2016). These issues are normal with every transition in life but appear to be worsened by the thriving trend of irregularities in the payment of the retirees in Nigeria. The result is decline in life satisfaction after retirement (Zhu & He, 2015). This absence of fulfillment is caused by several responsibilities following retirement which are hinged on some socio-demographic variables. However, this study is interested in two of these variables, income and age. The reason for the choice of these two variables in relation to depression is because income is vital at every stage of life, yet the capability of generating income is reduced at advanced years except with social support.

Income simply put is the amount of money that is acquired from savings, investments made, or work done for the purpose of satisfying needs at any given point in time. The income for the retired population mostly comes in form of pension. According to Central Statistics Agency (2018), the pension paid to these retired civil servants is quite insufficient to cover feeding, housing, other basic expenses, and healthcare. As a result, they experience financial difficulties. Retired civil servants are not paid their pension as at when due coupled with the fact that majority of them could not save and make investments in their service years since salaries paid could not cater for immediate needs of the family. Furthermore, retired civil servants are not paid their pensions on time, which further exacerbates their condition

since the bulk of them were unable to save and invest throughout their service years. Retired civil servants are known to be paid a portion of their salaries as pension and are also exempted from subsidized medical care they were enjoying while in service. Udo (2021) noted that 86 per cent of retired civil servants who have been debarred from funded medical care they enjoyed in their service years now seek medical care from traditional medicine, prayer houses and chemists due to lack of sufficient income. The author further stated that even though these retired civil servants are subjected to regular verification exercises, their pension payment remains irregular making it difficult for them to attend to their health and financial concerns. Consequently, many Nigerian older adults find it very difficult to adapt to life after retirement and experience mental health problems including depression. The incidence of depression is also impacted by age.

Age refers to the span of life or existence of an individual. Breheny and Griffiths (2017) defined age as the period someone has been alive, or something has existed. Department of Economic and Social Affairs, Population Division (2020) noted that the global population is ageing fast and that by 2020, 1 billion people were aged 60 years and above with the figure estimated to rise to 1.4 billion by 2030, signifying one in six persons globally. By 2050, the number of persons aged 60 years and above will have doubled to 2.1 billion. There is

the possibility that as one advances in age and retires, many transactions are made on the mind such as the inability to achieve things planned during the service years. There is a probability that as one ages and retires, they may have a lot of ruminations, such as their inability to reach goals they set for themselves during their service years. These cascades of thought could trigger depression among retirees as they might have retired from service with little or no achievement as older adults. Studies (Salihu & Udofia, 2016; Shittu et al., 2014) have shown that an association exists between age and depression. However, in other studies (Lamidi, 2016; Nisar et al., 2017) age was found to have no significant association with depression.

Late-life depression is a common and disabling mental health problem (Haigh et al., 2018). World Health Organisation (2023) noted that mental health of the elderly are not only affected by their social environment but also by the pooled effects of their life experiences, lack of access to quality support services and other stressors related to ageing such as hardship, decline in natural capacity and functional ability can all result in depression. It is possible that the socio-economic challenges in the country may present the retirees with the risks of depression. Therefore, there is need for emphasis on the impact of income and advanced age on their new status as retirees. This study is focused on male retirees.

The rationale for using male retirees is that Nigeria is a patriarchal

nation in which men have long been regarded as overseeing family obligations. They hold authority, direct the affairs of the home and virtually everything. Based on the aforementioned, the males cannot perform their responsibilities without regular inflow of income and when the expected is not achieved they appear to be at a higher risk of depression. Li et al. (2022) asserted that males and older workers with low socioeconomic status have high risk of depression. Contrarily, Fleischmann et al. (2020) observed that retirement was generally related to mental health improvements and that those who retired from poor working conditions experienced evident improvements in their mental health. This could be because of adjustments made over time. Centre for Disease Control and Prevention [CDC] (2022) observed that depression is not normal with aging, just that it is a medical condition which older adults are at increased risk of experiencing. By implication, if these older adults enjoy social care and financial support, they may not end up depressed.

Theoretical background of the study

This study was anchored on operant conditioning model developed by Skinner in 1937. The theory of operant conditioning by Skinner, 1971 stated that reinforcement is a powerful tool in the shaping and controlling behavior (Staddon & Cerutti, 2003). Operant conditioning states that depression is caused by the removal of positive reinforcement from the environment (Lewinsohn, 1974). This theory relates to this study, in that an individual can

get depressed when there is absence of positive reinforcement from the environment. With positive reinforcement, such as prompt payment of pension, enough to cater for immediate needs and social support, male retirees will undoubtedly experience conducive environment. Unfortunately, the reverse seems to be the case among retired civil staffs from University of Nigeria Nsukka, as a good number of them do not receive their gratuity and monthly pension years after retirement. To the best of the researcher's knowledge, no study has been conducted on the influence of income and age on depression among retired civil servants in University of Nigeria, Nsukka. Therefore, the study investigated the prevalence of depression among retired civil servants in a University in Nigeria. The relationship of income and age were also determined.

Research Questions

The following research questions have been posed to guide the study.

1. What is the prevalence and level of depression among male retirees of the University of Nigeria, Nsukka?
2. What is the relationship between income and level of depression among the respondents?
3. What is the relationship between age and level of depression among the male retirees?

Methodology

Study design: The study adopted the descriptive and correlational research survey design. Descriptive design was

used to obtain data on the prevalence of depression, while correlation was used to determine the relationships among study variables.

Study population: The population for the study comprised of 5000 male staff from the University of Nigeria, Nsukka who retired from January 2022 till date (Federal Universities Pensioners Association [FUPA], University of Nigeria, Nsukka, 2022).

Sample size selection procedure: The sample size for the study comprises 350 retired staff. This was derived using Taro Yamane formula for determining the sample size of a given population (1967). Taro Yamane's formula is $n = N / 1 + N(e)^2$ where n is the sample size, N is the population size, e is the level of significance. Simple random sampling without replacement was used to draw 350 retired civil servants from the population.

Instrument for data collection: A structured questionnaire was used to collect information on the socio-demographic characteristics of the respondents. Data on depression among the retirees were collected using a standardized scale titled Geriatric Depression Scale (GDS-15) developed by Sheikh and Yesavage (1986). This comprised of 15 items to determine the proportion of the retired civil servants experiencing depression. The respondents were expected to tick "Yes" or "No" as it applied to them. GDS-15 has 15 items, 10 out of the 15 items indicated the presence of depression when it is answered positively (Yes), while the rest of the questions with numbers 1, 5, 7, 11, 13

indicated the presence of depression when answered negatively (No). The reliability test of the instrument using Cronbach's alpha showed acceptable internal consistence (0.752).

Method of data collection: To gain access to the retired civil servants, a letter was obtained from the Head, Department of Human Kinetics and Health Education, University of Nigeria, Nsukka. The letter was presented to the chairman of FUPA seeking permission to carry out the study. Next, the researcher met with the retired civil servants in their meeting place. Three hundred and fifty copies of the questionnaire were administered to the respondents and 348 copies of the completed questionnaires were collected. This gave a 99% return rate.

Data and statistical analysis: The returned copies of the completed questionnaire were properly cross-checked for completeness of responses. All the respondents that answered 'yes' to depression items were assigned 1 and the respondents that answered 'no' were assigned 2. However, the reverse coding was also assigned 1 because their answers were positive to depression items. The responses of each respondent were summed up to get the total score for each of them. Scores of 0-4 indicated normal range, 4-8 showed mild depression, 8-11 indicated moderate depression while scores of 11-15 showed severe depression. The information from the copies of the questionnaires were coded into the International Business Machine

Statistical Package for Social Sciences, (IBM-SPSS), version 23.0. Data were analyzed using frequencies, percentages and chi-square. $P < 0.05$ was accepted as level of significance.

Results

Demographic data of the respondents

The age categories of the respondents were 65-74 years (27.3%), 75-84 years (40.8%), and 85+ years (31.9%). More than a quarter (29.0%) of them had a maximum of primary education, 43.4% had secondary education, and 27.6% had tertiary education. Some (21.8%) of them were single, 33.3% were married, 31.9% were divorced/separated, and 12.9% were widowed. Retired civil servants earning less than ₦50,000, ₦50,000-10,000 and ₦100,000 were 24.7% 35.6% and 39.7% respectively.

Prevalence and levels of depression among male retirees in UNN

The result in Figure 1 indicated that (44.0%) of retired civil servants experienced depression while 56.0% were not depressed.

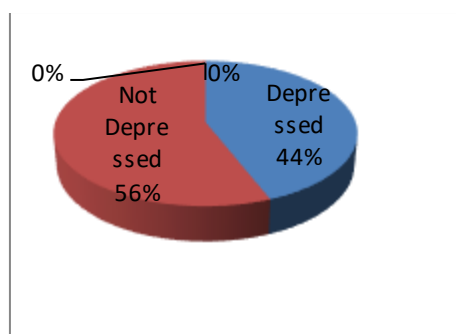


Figure 1: The prevalence of depression among retired male civil servants in UNN.

Figure 1 shows that all the retired male civil servants showed depression. More than half (56%) of retired male civil servants experienced moderate depression and 44% of retired male civil servants experienced severe depression.

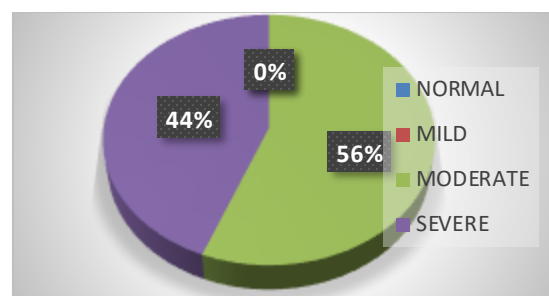


Figure 2: Level of depression among retired civil servants (Moderate to severe depression)

Relationship between income and depression among male retirees

The result in table 1 showed that there was significant relationship between depression and income. The proportion of male retirees earning less than ₦50,000 (65.3%) that were moderately depressed was high compared to those earning higher amounts. Among respondents earning less than ₦50,000 65.3% had moderate depression and 34.7% had severe depression. Out of respondents earning ₦50,000-100,000, 50.7% had moderate depression and 49.3% had severe depression. Among respondents earning less than ₦100,000, 51.2% had moderate depression and 48.8% had severe depression.

Table 1: Relationship between income and depression among retired civil servants

Income (₦)	Moderate depression F (%)	Severe depression F (%)	Total F (%)	χ^2 value	Df	P- Value
<₦50,000	81 (65.3)	43 (34.7)	124 (100)	6.750	2	0.034
₦50,000-100,000	70 (50.7)	68 (49.3)	138(100)			
>₦100,000	44 (51.2)	42 (48.8)	86(100)			

Key: F=Frequency, %=Percentages, χ^2 = Chi – square, Df = Degree of freedom, P-Value=Significant level

Relationship between age and depression among male retirees

Table 2 showed that there was no significant relationship between age and depression among male retirees. However, severe depression was recorded more among male retirees aged 85 and above (51.4%) compared to younger retired civil servants. Among respondents aged 65-74years,

61.1% had moderate depression and 38.9% had severe depression. Out of respondents aged 75-84years, 58.5% had moderate depression and 41.5% had severe depression. Among respondents aged 85years and above, 48.6% had moderate depression and 51.4% had severe depression.

Table 2: Relationship between Age and depression among Retired Civil Servant

Age (Years)	Moderate depression F (%)	Severe depression F (%)	Total F (%)	χ^2 value	Df	P- Value
65-74	58 (61.1)	37 (38.9)	95 (100)	3.765	2	0.152
75-84	83 (58.5)	58 (41.5)	141 (100)			
≥85	54 (48.6)	57 (51.4)	111 (100)			

Key: F=Frequency, %=percentages, χ^2 = Chi – square, Df= Degree of freedom, P-Value=Significant level

Discussions

The study generated information on the monthly income and age association with depression among retired male civil servants in University of Nigeria Nsukka, Enugu

state. The findings of the study are discussed below.

Prevalence and levels of depression among male retired civil servants in UNN

The findings in figure 1 revealed that 56% of retired civil servants experienced moderate depression and 44% of retired civil servants experienced severe depression. This result is expected and not surprising because majority of the retired civil servants that the researchers interacted with were hugely complaining over the maltreatment of the government on them. This implies that a good number of retired civil servant of University of Nigeria Nsukka of Enugu state experienced depression. This is in accordance with that of Ojagbemi and Gureje (2019) who reported that moderate proportion of retired civil servant in University of Ibadan experienced depression. The findings also agree with that of Uwakwe (2000) who also reported that almost half of the retired civil servant of a Federal Ministry in Nigeria experienced depression. It is however contrary to the assertion of Fleischmann et al. (2020) who noted that retired civil servants experience good mental health. It is also contrary to that of Central Statistics Agency [CSA], 2018 that opined that depression in elderly community is low. The discrepancies could be because of geographical area as well social support system that these different retirees are exposed to.

Relationship between income and depression among male retired civil servants in UNN

Result from table 1 revealed that there was significant relationship between the level of depression of retired civil servants and monthly income. This is

expected because it is naturally expected that there should be a relationship between depression and monthly income since retired civil servants are being owed their salaries. The finding is in tandem with those of Al-Shehri et al. (2022) who averred that there is a significant difference between depression and family income and that of Shittu et al. (2014) who observed a strong statistical association between depression and monthly income. However, this finding is contrary to those of Muhammad et al. (2018) who opined that there is no significant difference between low- and high-income earners on depression. This implies that there could be other factors apart from income that is responsible for depression among the retired civil servants in the area of study.

Result from table 1 also showed that the proportion of male retirees earning less than fifty thousand naira that were moderately depressed was high compared to those earning higher amounts. The implication is that earning less amount of money will increase the occurrence of depression. The result is in line with those of Li et al. (2022) who observed that male retirees with low income are at a higher risk of depression. Lack of income can heighten the development of depression which is associated with suicidal ideations and behaviors in the elderly (Petrova & Khvostikova, 2021). However, the study is divergent from those of Fleischmann et al. (2020) affirmed that retirement was generally related to mental health improvements

and that those who retired from poor working conditions experienced evident improvements in their mental health. This disparity could be because of proper orientation given to the low-income workers from the onset of their service years resulting in financial and psychological adjustment. It could also be because some of these retirees are being paid handsomely in addition to social support from the family, community and the government.

Relationship between age and depression among male retired civil servants in UNN

Result from table 1 showed that there was no significant difference in the proportion of retired civil servants who experience depression with age. This could imply that civil servants experiencing depression could be because of other factors aside age. This agrees with those of Yusuf and Adeoye (2011) who stated that though majority of civil servant are suffering from depression, there was no significant difference between the prevalence of depression among civil servants and age. Furthermore, Nisar et al. (2017) found that age has no significant association with depression as well. However, Shittu et al. (2014) observed an association between age and depression. This disparity could be because of socioeconomic, geopolitical and psychosocial variations among the retired civil servants.

Furthermore, result in table 2 showed that severe depression was recorded more among older male retirees compared to the younger ones.

This was expected because retired civil servants are aged individuals who retired from an organization after their active service for some years. Their retirement is meant to be a time of rest and remuneration with which to enjoy the fruit of their labour, but unfortunately, support for these retired civil servants is usually not adequate. The finding is in line with that of Nyberg et al. (2019), who averred that retired aged individuals with low social status predicted high depression. Haigh et al. (2018) also noted that depression follows a chronic course in older adults. The finding is contrary to the estimation of Centre for Disease Control and Prevention [CDC] (2022) who opined that depression is really not normal with old age. This implies that with conducive environment the old retirees may not experience depression.

Conclusion

The study showed the relationship of income and age with depression among retired male civil servants in University of Nigeria, Nsukka. The result of the study indicated that the prevalence of depression among theretired civil servants was high. Significant relationship existed between depression and income among male retirees. The proportion of male retirees earning less than ₦50,000 that were moderately depressed was high compared to those earning higher amounts, indication that depression increases as income decreases. The study also showed no significant relationship between age and

depression among male retirees. However, severe depression was recorded more among male retirees aged 85 and above compared to younger retired civil servants. This suggests that retired civil servants need to be cared for and supported so that they will live longer and enjoy their retirement years.

Recommendations

Based on the findings, discussion and conclusion thereof, it was recommended that:

1. The retired civil servants should be given proper attention after retirement from service by the government through paying their gratuity and subsequent pension as at when due.
2. Health education talks could be organized for the retired civil servants during their periodic association meetings to boost their morale and help to elongate their years.

Suggestion for further studies

The following areas were suggested for further research.

1. Prevalence of depression among retired female retirees in University of Nigeria, Nsukka.
2. Gender difference in the proportion of depression among retired civil servants of University of Nigeria, Nsukka.
3. Location or residence (Rural and Urban) as a correlate of depression among retired civil servants of University of Nigeria, Nsukka.

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Awareness and Experience of Occupational Hazards among Hairdressers in Umuahia Metropolis, Abia State, Nigeria

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Abstract

This study sought to determine the level of awareness of beauty salon workers regarding their occupational hazards, the prevalence of experiencing the hazards, and the preventive measures they take. The study employed the cross-sectional survey design and was guided by five research questions. The sample was 188 salon workers selected from 80 salons within Umuahia metropolis. The data were collected using a questionnaire and analyzed using frequency tables, percentages, and weighted means. Two academics validated the questionnaire, one in the Home Economics unit of the Department of Vocational Education and one from the Measurement and Evaluation unit of the Department of Psychological Foundations of the Abia State University, Uturu. A Cronbach's alpha reliability score of 0.84 was obtained. The results showed a high level (3.04) of awareness of the hazards associated with hairdressing occupation. The hairdressers also reported experiencing a feeling of tightness in the chest (46.3%), sneezing (67.6%), and itchy or runny eyes (58%) because of exposure to hair care chemicals. Other hazards they experienced were musculoskeletal problems such as neck pain (73.4%), back pain (76.1%), and shoulder pain (64.9%) because of long hours of poor work posture. The result further showed that the use of preventive measures was poor (21.56%). It was recommended among others that local and national health agencies should create more awareness among hairdressers about these hazards and how to prevent them. They should also be enlightened about managing and improving their work environment.

Keywords: Hairdressing, salon workers, musculoskeletal disorders, occupational hazards, Awareness

Introduction

Current emphasis on the acquisition of skills and employability among young persons has resulted in many of them showing interest in operating or working in hairdressing salons. There is, therefore, a proliferation of

small-scale salons in which persons with varying sociodemographic characteristics work. Among the characteristics of interest are age, marital status, level of education, work experience, number of hours of

work and so on (Tesfaye et al, 2019). A hairdresser is a professional who specializes in hairstyling, cutting, colouring, and grooming services in order to maintain or change a person's image (Hairdresser, 2020). Hairdressing usually consists of such hair care services as shampooing, cutting, colouring, styling, and hair extension, scalp treatment, among others. The ability to comprehend the work of a typical hairdresser in the Nigerian setting calls for an understanding of the uniqueness, nature and texture of the African hair compared to the Caucasian, Asian or American hairs. Although there is clear resemblance in the structure and chemical composition, the African hair is more tightly curled and entangles easily due to having a higher number of knots. It is also drier, more brittle, less shiny, and more fragile on account of the uneven distribution of sebum, and moisture along the hair shaft. These features cause the hair to break easily, and grooming is tough (Alchorne & Abrue, 2008; Archibong et al., 2018). As Moda and King (2019) observed, Afro-Caribbean salon operators are at a higher risk of exposure to pollution than their Caucasian counterparts. This is because of the nature and number of materials used in treating their customers' hair. Many hair treatments have been proven to contain chemicals considered harmful to humans. In addition, much longer hours are spent on styling the clients' hair, leading to long hours of standing and

maintaining postures that could result to hazards on the hair stylist.

According to Sasseville (2008), occupational disease is an ailment caused or aggravated because of exposure to work related risk factors. Infection can occur during hairdressing procedures since items such as razors, scissors, combs, clippers, and hairpins can accidentally penetrate the skin, or the hairdresser encounter the body fluid of the client. Due to the nature of the business, salon operators are exposed to several chemicals through both their skin and respiratory system from hair dyes, bleach, shampoos, hair conditioners, hair relaxers, permanent wave solutions, detergents, hair spray and perfumes (De Gennaro et al., 2014; Nemer et al., 2015). This exposure can likewise affect the customers and others present within the indoor environment where these cosmetic products are being used (De Gennaro et al., 2014). An inventory of cosmetic ingredients reported by the European Union and other researchers revealed that products used in the industry contain over 5000 volatile substances that are either harmful, irritants or toxicogenic (Mandiracioglu et al., 2009; Liu et al., 2018). Due to the nature of hair products, their frequent use exposes the operators to harmful chemicals which are either known or suspected allergens, carcinogens or organic solvents that arise from activities including hair dyeing, shampooing, hair conditioning, hair sprays, hair relaxing, hair bleaching,

Brazilian blowout and many more (Lysdal et al., 2011).

Several studies indicate that hairdressing salon operators are more likely to experience skin disease conditions that include occupational dermatitis than people in other professions (Archibong et al, 2018; Chang et al., 2018; Ibler et al., 2012; Wiszniewska & Walusiak-Skorupa, 2015), as a result of exposure to chemicals or prolonged wet work. This could also be triggered by other factors such as bacterial infections and chemical burns (Steengaard et al, 2016). Dermatitis is defined as inflammation of the upper layers of the skin due to irritant exposure; it usually presents with redness, swelling, itching, and pain. Severity ranges from mild irritation to severe inflammation. People with a history of skin allergies (for example eczema or asthma patients) are more likely to develop dermatitis (Department of Health, Government of South Australia, 2009). Other infections that can be spread in hairdressing premises include skin infections on the scalp, face, and neck such as impetigo and fungal infections such as tinea capitis and ring worm. Burns can also occur during hairdressing procedures involving hot rollers, tongs, and crimpers and when hair is being washed with contaminated water or when stationary or hand-held dryers are improperly used. Ruddy et al. (2001) reports that people have been infected with head lice from direct hair-to-hair contact with someone who has head lice.

A study in Nigeria revealed that needle stick injuries, reactions to hair relaxing creams, cuts, burns, electric shocks and low back pain constituted occupational diseases among hairdressers with such hazards reported by 5% of respondents (Omokhodion et al., 2009). Due to the fact that most contact is made with the hands and forearms, these regions are largely affected, but spread to other parts of the body (Archibong et al, 2018). In the same vein, musculoskeletal disorders (MSD) have been reported by hairdressers and are usually linked to bio-mechanical, ergonomic and psycho-social professional factors. Prolonged standing, use of vibrating tools, and awkward body postures may greatly contribute to developing these complaints among hairdressers (Hassan and Bayomy, 2015). Previous studies also showed that female hairdressers are at a higher risk of developing reproductive health problems including changes in the menstrual cycles, infertility, spontaneous abortion, low birth weight (LBW) and preterm delivery (Kim et al., 2016).

Many hairdressers are self-employed and engaged in small scale salons, where conditions of service are stringent. This promotes an environment in which there is limited support for them to manage their own health. During a typical work week, a hairdresser can be exposed to hundreds of different chemicals through the skin as well as the respiratory system. Volatile organic

chemicals (e.g. toluene, ethanol, isopropanol, ether, diaminotoluene, paraphenylenediamine) contained in hairsprays and setting lotions, as well as ammonia, ammonium per sulphates, hydrogen peroxide, sodium hydroxide, dioxane and organic pigments found in permanent waves cream, hair dyes and hair bleach find their way into the body during application. The occupational environment for these set of people mostly involve unsafe and unhealthy exposures, which in turn leads to significant health hazards such as respiratory, musculoskeletal, skin, and reproductive challenges. In Nigeria, the information on the prevalence of occupationally related hazards reported symptoms among hairdressers, caused by reactive chemicals used in hairdressing salons is limited. It is therefore the aim of this paper to ascertain the awareness level of salon workers regarding this crucial issue, and to find out if they understand the extent to which they are affected by the work hazards present in beauty parlours, including how to prevent them. It is, also, intended to determine the sociodemographic characteristics of the hairdressers.

Objectives of the study: The main purpose of the study was to determine the level of awareness of occupational hazards by hairdressers in Umuahia metropolis. More specifically, the study intended to:

- i. determine the awareness level of the respondents on occupational

health hazards associated with hairdressing;

- ii. ascertain the extent of experiencing occupational health hazards among the respondents; and
- iii. identify the protective measures taken by the respondents while providing services.

Methodology

Research Design: The cross-sectional survey design was adopted for the study. The design was adopted because the researcher did not in any way manipulate or influence the data obtained nor were the respondents influenced in any way.

Population of the Study: The study population consisted of 200 hairdressers identified by the researcher in 80 hair salons within Umuahia metropolis. Due to a manageable population size, no sampling was carried out. Twelve (12) persons, however, declined to participate, thus, leaving a total of 188 participants.

Instrument of Data Collection: A structured questionnaire was used to collect data. The questionnaire was divided into four parts: Part 1 requested the demographic information of the respondents. Part 2 elicited information on the general knowledge on the risk involved in hairdressing occupation. This was measured using a 1-5 scale (1 = Not at all aware, to 5 = Very aware). Part 3 was used to obtain data on health-related challenges they have encountered/or are currently facing

because of their work. Part 4 obtained information on the protective measures being taken by the respondents.

Validity/Reliability of Measuring Instrument: To ensure validity of the instruments used in the study, face validity technique was employed. The questionnaire received the approval of two academics in the Home Economics unit of the Department of Vocational Education and one from Measurement and Evaluation of the Department of Psychological Foundations of the Abia State University, Uturu, who ensured that the questions were in line with the objectives of the research. Secondly, the questions were tested for clarity to avoid ambiguity of language. To ascertain the reliability of the questionnaire, the questionnaire was administered to twenty (20) participants selected from outside the metropolis. The instrument was administered twice, while the data obtained were subjected to a reliability test using Cronbach's alpha reliability which showed a correlation coefficient of 0.84.

Method of data collection: Data was collected over a period of two months. An average of 7-8 questionnaires was shared per day and salons were visited between 11am - 4pm three times a week between Thursdays and Saturdays. The chosen timeframe coincides with peak business hours and the days were chosen based on their closeness to the weekend, considering that most women often book their hair services appointment around this time. The copies of the

questionnaire for data collection were distributed with the help of two research assistants. The research assistants underwent a comprehensive training session covering the objectives of the study, ethical considerations, and protocols for questionnaire distribution and respondent interaction. Specific instructions were provided on approaching salon owners, explaining the purpose of the study, and assisting respondents with any questions or clarifications needed. Role-playing exercises were conducted to simulate real-world scenarios and enhance the assistants' readiness for fieldwork. These assistants aided in sharing the questionnaires and providing aid and clarification to the respondents wherever needed. They ensured the efficient dissemination of the questionnaires and facilitated the collection process, contributing to the overall success of the data collection phase. All questionnaires were retrieved on the same day. A total of 200 copies of the questionnaire were printed for data collection, however, only 188 were distributed. All administered copies were retrieved successfully. Consents were obtained from the participants by ensuring they signed the consent page attached to each questionnaire.

Data and Statistical Analyses: The data gathered were analysed quantitatively using frequency tables, percentages and mean. The benchmark for weighted mean was 3.0 that determine acceptance or rejection of the questionnaire item.

Results

Table 1 presents the socio-demographic characteristics of the hairdressers. It indicates that 34% of the respondents which constitute the majority are within the age bracket of 26 to 35 years. A good majority of the women (61.1%) were married; however, only 17.5% have attained the

tertiary level in education. Majority (47.3%), of the respondents were apprentice, 37.8% had over 7 years of experience in the industry and 11.7% worked for an entire week, with a minimum of 8 working hours, each day.

Table 1: Demographic data of respondents Awareness level of the respondents on occupational health hazards associated with hairdressing

Variables			
Age	16 - 25	26- 45	46 and above
Frequency.	49	116	23
Percentage (%)	26.0	61.80	12.20
Marital Status	Single	Married	Divorced
Frequency.	71	115	2
Percentage (%)	37.70	61.10	1.10
Education	Primary	Secondary	Tertiary
Frequency.	44	111	33
Percentage (%)	23.40	59.00	17.50
Status	Owner	Worker	Apprentice
Frequency.	78	21	89
Percentage (%)	41.50	11.20	47.30
Work Experience	1-3yrs	4-6yrs	7yrs and above
Frequency.	34	83	71
Percentage (%)	18.10	44.10	37.80
Daily Working Hours	8am-4pm	8am-6pm	8am -8pm
Frequency.	27	109	52
Percentage (%)	14.40	57.90	27.70
Workdays per Week	1-5 days	6days	7days
Frequency.	14	152	22
Percentage (%)	7.40	80.90	11.70

Data in table 2 indicates the knowledge of work-related health hazards among the hairdressers. The respondents were aware of work hazards such as body aches due to prolonged standing (mean = 3.90), respiratory problems (3.70), infection due to contact with clients' body fluids (3.30) and skin problems due to contact with chemicals (3.20). A

good number (54.30%) of the respondents showed high level of awareness of body aches, respiratory problems (49.50%), infections (40.40%) and skin problems (31.40). There was a low-level awareness of reproductive problems with only 8.0% being highly aware and 51.60% not aware of the problem.

Table 2: Hairdressers' level of awareness of work hazards in workplace

Variables	Highly Aware F (%)	Aware F (%)	Moderately Aware F (%)	Slightly Aware F (%)	Not Aware F (%)	Mean
Skin problems, are because of constant exposure to hair chemicals	59 (31.40)	38 (20.20)	18 (9.60)	34 (18.10)	39 (20.70)	3.20
Exposure to infections contact with fluid, blood, or soiled work tools.	76 (40.40)	47 (25.0)	38 (20.20)	10 (5.30)	7 (9.0)	3.30
Exposure to reproductive toxicants in hair products	15 (8.0)	17 (9.0)	26 (13.80)	33 (17.50)	97 (51.60)	2.04
Risk of respiratory problems (chest tightness, cough, sneezing, eye irritation, etc).	93 (49.50)	25 (13.30)	19 (10.10)	14 (7.40)	37 (19.60)	3.70
Body ache (pain in the neck, shoulder, and lower back) due to poor work posture	102 (54.30)	36 (19.10)	9 (4.70)	17 (9)	24 (13.80)	3.90

Grand mean = 3.9

Extent of experiencing occupational health hazards among the respondents.

Table 3 reveals the proportion of the respondents who have experienced health-related problems associated with hairdressing. The common health challenges reported by hairdressers

while carrying out hair care activities include feeling of tightness in the chest (46.3%), sneezing (67.6%), itchy or runny eyes (58%), neck pain (73.4%), back pain (76.1%), and shoulder pain (64.9%).

Table 3: Health problems reported by hairdressers while using some hair products during work hours

Variables	Yes F (%)	No F (%)
Shortness of breath while using chemicals like hair dyes, relaxers, texturisers.	74 (39.4)	114 (60.6)
Coughing when using chemicals such as hair relaxers and colours	91 (48.4)	97 (51.6)
Sneezing as a result of inhaling chemicals in hair products	127(67.6)	61 (32.4)
Tightness in the chest because of exposure to chemicals in hair products	87 (46.3)	101 (53.7)
Eye irritation from chemicals and airborne particles	109 (58)	79 (42)
Skin burns caused by contact with hot combs, straighteners, and	62 (33)	126 (67)

chemicals		
Neck pain during or after hair styling activities	138 (73.4)	50 (26.5)
Shoulder pain during hair plaiting and other hair styling activities	122(64.9)	66 (35.1)
Waist pain	104 (55.3)	84 (44.7)
Hand and wrist pain during or after hair perming, plaiting and others.	89 (47.3)	99 (52.7)
Back pain during or after work in the salon.	143 (76.1)	45 (23.9)
Leg pain from standing while offering hair styling services.	81 (43.1)	107 (56.9)
Knee pain during or after hair plaiting, perming, dyeing and others.	33 (17.6)	155 (82.4)
Swollen feet after prolonged standing from hair styling activities	64 (34)	124 (66)

Protective measures taken by the respondents while providing services

Table 4 shows the protective measures taken by the respondents while providing services. Data shows a low adoption of preventive measures by hairdressers such as hand gloves (29.8%), nose mask (14.4%), apron (6.4%), and the availability of adequate ventilation (17.6%).

Table 4: Use of Protective Measures

Variables	YesF (%)	No F (%)
Use of hand gloves	56 (29.8)	132 (70.2)
Use of nose mask	27 (14.4)	161(85.6)
Use of apron	12(6.4)	177(94.1)
Adequate ventilation	33(17.6)	155(82.4)
Regular hand washing	47(25)	141(75)
Regular breaks	53(28.2)	135(71.8)
Well positioned wash tub	72(38.3)	116(61.7)
Use of comfortable chairs	84(44.7)	104(55.3)

Discussion of Findings

The study investigated the level of awareness of health hazards related to hairdressing and identified the proportion of respondents who had experienced the hazards. Concerning the hairdressers' level of awareness of occupational hazards associated with their job, the findings showed a considerable level of awareness regarding skin problems such as eczema, dermatitis, discoloured nails, etc, associated with hair products. While awareness about skin problems resulting from exposure to hair care

chemicals was relatively high (3.20), understanding of reproductive challenges and respiratory discomforts due to irritants was comparatively lower (2.04). It is crucial for hairdressers to be aware of all potential risks, including the less obvious hazards, to protect themselves and their clients completely. The consequential implication arising from the insufficient awareness regarding internal health issues potentially stemming from their occupation is that hairdressers may unknowingly endure such health complications, oblivious to the exacerbating impact of continued

exposure in their line of work. Rectifying this knowledge deficit stands to enhance the overall safety and welfare of hairdressing professionals. Moreover, heightened awareness among hairdressers regarding the inherent occupational risks enables them to make more informed decisions concerning their career path, thus fostering a proactive approach to personal health and safety. This position agrees with Mohammed et al., (2023), who discovered that 54.3% of the studied hairdressers in Benha City, Egypt, had average knowledge about occupational health hazards, while 41.1% had poor knowledge and only 4.6% had good knowledge about occupational health hazards. In contrast, Abia et al., (2016) recorded a high awareness level of occupational hazards among its respondents in Cameroon. Equally, the respondents' awareness of their susceptibility to infection through unhygienic routes received statistical support (3.3), just as the understanding that respiratory discomforts caused by irritants led to chest tightness, coughing, and sneezing, among others (3.7).

The findings on the extent of experiencing occupational health hazards showed that many of the respondents have had health problems as a result of hairdressing activities like using hair sprays, applying hair relaxers, etc. More than half (58%) of them have had itchy eyes, sneezing (67.6%), and nose tightness in the chest (46.3%), among others, due to contact with hair care products. Experiencing

health problems such as itchy eyes, sneezing, and chest tightness due to exposure to hair care products poses several dangers to hairdressers. Firstly, these symptoms can significantly impact the overall productivity of individuals by hindering their ability to perform their duties effectively. Itchy eyes and sneezing, for example, can cause discomfort and distraction, leading to difficulty focusing on tasks and completing them efficiently. Similarly, chest tightness can make breathing difficult, resulting in fatigue and reduced stamina, further impairing productivity. Moreover, these health problems can also have a detrimental effect on the well-being of individuals. Chronic exposure to irritants in hair care products can exacerbate respiratory conditions such as asthma or bronchitis, leading to long-term health complications. Additionally, repeated exposure to harmful chemicals may increase the risk of developing allergies or sensitivities, affecting the hairdressers' quality of life both inside and outside the workplace. Furthermore, neglecting these symptoms or failing to address the underlying occupational hazards can potentially lead to more serious health issues over time, jeopardising the overall well-being and longevity of individuals. A study by Saraga et al. (2014) measured respirable particulate matter or RPM (i.e., suspended particle fraction with aerodynamic diameter <4µm) in the breathing zone of Greek volunteers, including two hairdressers and eight customers in a hair salon. A

hairdresser using hairspray and a hairdryer was exposed to the highest levels of RPM (286µm-3). Caroe et al. (2016) established that hairdressers are at risk of developing occupational contact dermatitis due to their intense and frequent contact with liquids as well as chemical components contained in hair products like creams, waxes, gels, dyes, and bleaches. Dodson et al. (2012) further buttresses this in a study that quantified endocrine disruptors and asthma-related chemicals in a wide range of cosmetics, personal care products, cleaners, sunscreens, and vinyl products. The study found that ingredients in products used in hair and nail salons include endocrine disrupting compounds (EDCs) like parabens and phthalates. EDCs can mimic or block endogenous endocrine function, with wide-ranging health implications, including reproductive effects. Furthermore, it was agreed that prolonged standing and awkward body postures were contributory factors to pain in the neck, shoulder, and lower back (54.3%). Neck pain (73.4%), back pain (76.1%) and shoulder pain (64.9%) were the most common forms of musculoskeletal problems reported by the respondents. This result agrees with the findings of Hassan and Bayomy (2015) in a study about occupational respiratory and musculoskeletal symptoms among Egyptian female hairdressers. The results revealed that, the most prevalent musculoskeletal pains reported by the hairdressers over the past 12 months were elbow and

shoulder pain as well as back pain. The respondents also reported that the most frequent chronic pains (7.5%) were back and knee pains while hand and wrist pain led 12.5% of hairdressers to visit a doctor. Meanwhile, shoulder and back pain caused 13.8% of the respondents to be absent from work due to sickness.

Lastly, regarding the application of protective measures, a majority of the respondents reported the non-use of hand gloves. This might be due to inability to work effectively while wearing them making them unable to provide satisfactory services to their clients. This finding is supported by Moda and King (2019) who found that hairdressers often ignored hand gloves during wet activities because the multi-tasking nature of the job required putting it on and taking it off; hence most participants did not fancy using them, while others stated that the frequent use of gloves made their hands sweat and that glove-use could cause allergic reactions. The inconsistent use of personal protective equipment leads to exposure to hazardous chemicals in the workplace, making hairdressers more susceptible to occupational illness; unfortunately, the use of personal protective equipment (PPE) has not been totally emphasized in the profession of hairdressing (Jack, 2009). PPEs such as gloves and nose masks that can serve as adequate protection against physical contact with chemical substances such as phenylenediamine and formaldehyde have been neglected. Overall, the application of

protective measures was poor including adequate ventilation of the premises which is essential during the use of hair chemicals and sprays.

Conclusion

This study sheds light on the level of awareness, experiences, and use of protective measures regarding occupational hazards among hairdressers in Umuahia metropolis. The findings reveal a significant level of awareness among hairdressers regarding certain occupational health hazards, particularly skin problems and respiratory discomforts caused by hairdressing activities. However, there is a gap in awareness concerning internal predicaments like reproductive challenges due to infection. The study also highlights a high prevalence of health complaints among hairdressers, including respiratory symptoms, musculoskeletal problems, and skin irritations, which are often attributed to exposure to chemicals and prolonged standing. Additionally, the use of protective measures among hairdressers is inadequate, with low utilization of hand gloves, nose masks, and other personal protective equipment. These findings underscore the need for increased education and enforcement of safety measures in hairdressing salons to mitigate occupational health risks and promote the well-being of hairdressers.

Recommendation

Based on the outcome, this paper recommends the following:

- i. Both local and national health agencies should create more awareness and enlighten hairdressers on ways to prevent, manage, and improve their work environment. Salon-to-salon campaigns, distribution of health pamphlets and health messages are needed to raise the level of knowledge and inculcate safe work practices among hairdressers, alongside encouraging the use of protective equipment.
- ii. Efforts should be made by government regulatory agencies to monitor the activities of manufacturers of hair products. In Abia state in particular, the activities of charlatans are high because of the large markets available to them. Hence, authorities in charge of controlling such excesses should enforce the necessary measures on handling hazardous chemicals among producers.
- iii. Lastly, hairdressers should endeavour to secure work environment with larger space and adequate ventilation.
- iv. Regulatory bodies should see to a mandatory capacity building for hairdressers.

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